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Causes of the Chronic Abuse of Narcotic Drugs

By Pr. Dr. Erich Knaffl-Lenz

Dr. Erich von Knaffl-Lenz, Professor at the University of Vienna, took an active part, as an expert in pharmacological and chemical questions, in the drafting of the 1931 Convention for the Limitation of the Manufacture of Narcotic Drugs. Dr. von Knaffl-Lenz in a first article studies causes of the chronic abuse of narcortic drugs, and in a second article gives an account of his experiences as an expert of the League of Nations.

The non-medical use of drugs and chemical compounds which are subject to the provisions of the Opium Convention on account of their detrimental effects on health cannot be combated effectively until the numerous causes of such abuse have been ascertained. It is not simply a medical and administrative problem but rather one of social hygiene, of economics and, not least, of criminology.

Before describing the work of the League of Nations, it will therefore be useful to discuss some of these questions briefly and to state the views which the present writer has formed in the course of many years' work as an expert at the League.

The need for substances which have a pleasurable effect on our sensory organs or have a stimulating or narcotic effect on the central nervous system has been felt by all peoples since early times. Substances of the latter kind also played an important part in religious ceremonies and festivals.

Though themselves devoid of nutritive value, when added to food, they have the property of enhancing its flavour and hence its attractiveness by stimulating the nerves of taste and smell and of substantially increasing its digestibility by stimulating the secretion of saliva and digestive juices. Their action is confined to the sensory organs, and even their chronic use does not result in a morbid craving or in damage to health. But there are some which in addition have a stimulating or narcotic effect on the central nervous system, as is the case, for example, with tobacco, alcoholic and caffein-containing beverages. Though harmless if consumed in moderation, they may be conducive to improper use, resulting in addiction and over-dosage and hence in damage to the nervous system.

The German language describes such drugs or preparations of drugs as "means of enjoyment" (*Genüssmittel*) as opposed to "means of nourishment" (*Nährungsmittel*), since their sole value lies in affording pleasure. There is no equivalent term in either English or French.

A common feature of all these "means of enjoyment" is the fact that they are not simple substances but drugs or preparations of drugs. Their value lies in the combined action of several substances, which are often not present in the original drug, but are formed in the process of roasting or fermentation, in the course of which the substances acting upon the nervous system sustain a substantial loss but no diminution of their pleasure value.

By reason of their complex action, they possess not merely sensory but mental properties. Smell, colour and taste affect our senses pleasantly, thereby furnishing aesthetic pleasures, creating illusions, inducing pleasant moods, suppressing the consciousness of inhibiting influences, and thus providing temporary distraction from the cares of everyday life. Their mental action can stimulate or facilitate intellectual or creative work. The extent of such action is substantially affected not only by the personality structure but also by the cultural level of the user. It may therefore well be that intellectual workers — scholars, musicians, artists and writers — are precisely those who have a stronger and more varied need for such drugs. Their complex action on an over-refined and sensitive nervous system may be such that they are not felt to be in any way disturbing.

The nicotine content does not play a decisive role in the enjoyment of tobacco. If that were so, solutions of nicotine would be a much less expensive substitute. Decisive factors in its enjoyment are the packing, the form and colour of the cigar, the wrapper, the aroma, the type of pipe, etc. All the senses are engaged in smoking — touch, sight, smell and taste. Feelings of hostility which might be aroused by an unwelcome interruption of work do not materialize, because the occupation of all the senses produces an impression of activity, which is in fact non-existent. Boredom does not arise, mental work is more readily accomplished, disturbing anxiety is relieved, fatigue is banished, and preoccupation with the ego is lessened with a resultant increase in sociability. These psychical effects facilitate the course of negotiations, as we know from the pipe of peace and the good cigar.

With neurotics, however, the action of nicotine on the vegetative nervous system is also of importance. For them tobaccos with a low nicotine content do not produce the desired effect. Addiction soon develops, as does a craving for the effect of nicotine, which is difficult to suppress. The pure "means of enjoyment" thus becomes an intoxicant.

The situation is very similar in the case of alcoholic beverages. When consumed in moderation for the pleasurable aroma, colour and taste of wine and for their effect of producing mild euphoria and conducing to sociability, they may be regarded as a harmless means of enjoyment. Where, however, they are consumed in the form of more or less diluted pure alcohol for the purpose of producing intoxication, there is a risk of chronic abuse and of serious damage to health; the harmless stimulant becomes the dangerous intoxicant which led to the almost complete extermination of certain populations.

The value of caffein-containing beverages as stimulants is only in small part attributable to the action of the aromatic by-products produced through the roasting or fermentation process; it is almost exclusively due to the stimulating effect of caffein on the brain, as a result of which fatigue is banished, mental concentration and the process of thought facilitated and a mild state of euphoria produced. Alcoholic beverages are capable of producing the same effects but do so by narcotic action, through which disturbing inhibitions and hostility feelings are removed.

But physical capacities are also heightened. The psychomotor stimulation, which is not unwelcome in sport but is disturbing to mental activity, is weakened by the volatile oils contained in tea. Tea is therefore the appropriate stimulant for intellectual workers and coffee for those who engage in sport.

Caffein-containing beverages are unlikely to lead to abuse, since, if taken in large quantities, they have unpleasant subsidiary effects, such as palpitation, sleeplessness, nervousness and digestive disturbances.

While physiological effects may be the same in different races, the psychical effects vary. They are affected by the psychical make-up, by tradition, culture and the degree of development. It is natural that the imaginative Oriental should find a particular pleasure in the action of hashish, which stimulates his imagination and gives him the illusion of an artificial paradise, that the contemplative Asiatic should prefer the narcotic effect of opium while the active Northerner takes greater pleasure in the stimulating effect of alcohol.

Alcohol was well known to the aboriginal inhabitants of America and Australia before their discovery by white men. It was not, however, used as a "means of enjoyment" but solely in connexion with ceremonies and religious celebrations. It was their conquerors who first introduced them to the abuse of pure alcohol, which proved to be a deadly poison to their peoples. There is thus no substance which is *per se* a "means of enjoyment" or an intoxicant.

To sum up what the "means of enjoyment" have to offer to the healthy individual, we must conclude that their moderate use is conducive to both physical and mental pleasure, which, depending upon the personality of the user, can have most valuable effects and can add to the beauty of life. There is therefore no ground for restricting their consumption.

But in addition to these relatively harmless means of enjoyment there are drugs, which have therapeutic value by reason of their stimulating or depressing effects on the central nervous system, but which on account of these effects are liable to abuse by normal persons and particularly by neurotics; the chronic use of such drugs may be seriously harmful to health and may become a deadly poison for whole peoples.

Such drugs were used in the earliest times by all peoples in connexion with religious ceremonies, since they were capable of transporting those who used them into a condition of heightened instinctive and emotional as opposed to intellectual activity, in which subconscious impulses and wishes are brought to the surface and the conscious ego detached from the external world. The illusion of contact with the supernatural and the ability to foresee the future is thus created.

These drugs differ from "means of enjoyment" in that they are used only for their effect on the brain and that their psychic effects depend essentially on the personality structure of the user. They include in the first place opium, the morphine extracted therefrom and its derivatives, and also cocaine and hashish (marihuana).

The decisions of the International Opium Conference to which these drugs are subject are intended to make their non-medical use impossible, by ensuring that only such quantities are produced as are required for purely medical purposes.

Since the physiological effects of the drugs in question vary, it is not possible to find a common description for them in any language. Opium is a purely narcotic poison, the stimulating effects of which are probably to be attributed to paralysis of the inhibitory centres. Cocaine is a pure stimulant, and hashish or marihuana are first stimulating and then narcotic. Unlike the other two drugs, morphine does not cause any intoxication. Addiction in the strict sense of the word — and then exclusively in persons with a predisposition — is caused only by morphine and its derivatives, and possibly by hashish.

The various descriptions such as "narcotic drugs", *stupéfiants*, *Betäubungsmittel* and *Rauschgift* or *Suchtgift* are therefore inaccurate. Only the description "substances falling under the provisions of the Opium Convention" would be correct.

The effects of many extraneous substances grow steadily weaker when they have remained in the system for a considerable time. In order to achieve the original effect, the doses must be constantly increased. That is particularly true in the case of substances affecting the nervous system, such as the opiates, the soporifics, alcohol and nicotine. The reasons for this are various: the phenomenon may be attributable to speedier destruction or excretion, to conversion into substances that do not produce any effect or to reduced sensitivity of the cells affected. In this connexion the terms habituation or increased tolerance are employed. This is to be regarded as a defensive *biological* reaction.

Whereas in the case of mentally healthy people the absorption of opiates alleviates bodily pains, eliminates cramps, and induces tiredness and increased disposition to sleep, and in large doses produces narcosis, there is a type of person who reacts with a hitherto unknown feeling of well-being and happiness called euphoria. The desire for a repetition of this experience soon asserts itself and demands ever-increasing doses. In the end, the individual is unable any longer to withstand this morbid desire unaided. If the desire is not satisfied by a renewed dose of morphine, severe morbid mental and physical symptoms appear and create a compulsion to further misuse of morphine. When this condition, which is described as toxicomania, has established itself, further doses of morphine do not induce euphoria but serve only to prevent the outbreak of abstinence symptoms.

Whereas after the administration of morphine has been discontinued and physical recovery achieved a person chronically infected with morphine feels no further desire for morphine and reacts with only slight symptoms of abstinence, a morphine addict requires, after dishabituation and physical recovery, continuous mental and physical treatment in an institution in order to be cured of his morbid desire and made fit for work again.

The disposition to addiction may be regarded as a latent disease which does not become manifest until morphine has been administered.

People predisposed to addiction belong to a type of neurotics characterized by a disparity between their abilities and their need for recognition. This disparity is based, not on lack of intelligence, but on reduced powers of concentration and endurance, caused in turn partly by over-excitability and partly by the tendency of the nervous system to become easily and quickly fatigued. Organic sensations and fits of depression are felt much more strongly and cannot be overcome, as in the case of healthy people, by the individual's own resources.

The psychopathic symptoms of a disposition to addiction can often be traced back to early infancy and include lack of appetite, hypersensitivity to noises, smells and pain, susceptibility to mental and physical fatigue, disturbed sleep, inclination to depression and vasomotor disturbances, etc. In the case of adults, predisposition to addiction is largely determined by the type of reaction to such mental disturbances.

The effects of codein and similar morphine derivatives differ from those of morphine in that they lack its analgetic properties, though the other effects differ only quantitatively. In cases of prolonged usage, and where the doses were larger than those required for purely therapeutic purposes, habituation and chronic poisoning were occasionally established, but no addiction. Not until the 1930's were cases of true codein addiction reported in Germany and Poland. These cases displayed symptoms of addiction similar to but weaker than those displayed by morphine addicts. Then reports of such cases came in increasing numbers from Canada and the United States of America. The difficulty of obtaining morphine made morphine addicts try to find a substitute in codein, of which they took large doses (up to 4 grammes) in subcutaneous or intravenous injections. In such large doses, codein also has analgetic properties. This last characteristic would therefore seem to be decisive in causing addiction. It has hitherto been found that all the new synthetic substitute products having the effects of morphine are more or less capable of producing addiction. It would be interesting to determine whether there is any correlation between the strength of the analgetic effects and the intensity of the addiction caused. Experiences with heroin and also with eucodal would seem to indicate that such a correlation exists. According to those experiences, it is the psychopathic constitution and reaction of the individual rather than the chemical composition of the compound which seems to determine whether a compound has any addiction-causing properties or not. If this hypothesis is correct, there would appear to be no prospect of finding a compound with the analgetic properties of morphine and without the tendency to produce addiction in those predisposed thereto.

At the end of the last century a morphine derivative, diacetylmorphine, was discovered, which was called heroin on account of its heroic effects, these being about three or four times as strong as those of morphine. Since it is also a stimulant and induces euphoria even in small doses, it at first enjoyed great favour in institutions for the treatment of pulmonary diseases. It soon became manifest, however, that not only the therapeutic effects, but also the toxic effects were considerably stronger, that it led much more quickly to addiction, that the addiction it produced was much more difficult to treat because of the severe damage to the circulatory system, and finally that the resultant moral disintegration was also much more extreme than in the case of chronic misuse of morphine. On the basis of this experience, warnings against the use of heroin were issued in Germany at a very early stage. Its use in clinical hospitals practically came to an end, whereas in England and France it is still much

used by practitioners. When it was discovered that it could be absorbed through the nostrils like cocaine, it was quickly welcomed in consumer circles on account of its stimulating effects and its ability to eliminate inhibitions and self-control, and it became the most serious competitor of morphine and cocaine.

Whereas to mentally healthy people morphine does not offer any temptation to misuse, even healthy people can be induced to misuse heroin because of its stimulating and sexually exciting effects.

Owing to its small bulk, heroin is more adapted to the illicit traffic than any other narcotic. It is understandable that in many countries diacetylmorphine should have been removed from the pharmacopoeia and its manufacture prohibited.

In Egypt, the misuse of narcotics, chiefly hashish and opium, was customary in certain circles before the First World War. Not until 1917, after large quantities of cocaine had been imported, did the consumption of cocaine among the middle classes assume the proportions of a social plague. The industrious and healthy fellaheen, however, escaped, because among them the conditions requisite for the misuse of narcotic and stimulating poisons did not exist.

When in 1927, however, large quantities of diacetylmorphine and similar morphine esters with comparable effects but not covered by the provisions of the Opium Convention were smuggled very skilfully into Egypt by an organization engaging in the illicit traffic and were offered to the fellaheen as aphrodisiacs, the young men between 20 and 40 quickly fell into temptation. In the course of a few years, half a million out of a total peasant population of 7 million had already fallen victims to the poison.

The explanation why a healthy, industrious peasant population which had not hitherto been addicted to the misuse of narcotics should have fallen victim to the poison to this extent must be sought in psychological causes. For the poor, hard-working Oriental, sexual satisfaction and the desire for progeny are almost the only joys in life which can be easily obtained without material sacrifice. It is therefore understandable that he should quickly fall victim to a poison, which, as propaganda asserted, would ensure him the satisfaction of this desire to a heightened degree. The stimulating effect of heroin produces a sensation of potency, while in a young man the narcotic effect restrains the sexual excitement so that the culmination of the orgasm is delayed. The initially stimulating effect soon loses its strength, however, and makes it necessary to increase the dose. The result of this is an intensification of the narcotic effect which in the end leads to impotence. This effect of heroin also makes it understandable why the older men did not succumb to the temptation, for the repressive effect was stronger than they desired.

Those who became addicts were forced to engage in the illicit traffic themselves and to pass on the poison as a condition of obtaining the quantities they needed themselves. The misuse resulted in impoverishment, severe under-nourishment, reduced capacity for labour, physical and moral degeneration, and sterility among young males. The absorption of heroin in the form of snuff was often replaced by subcutaneous or intravenous injections, and the result of this was blood-poisoning and the transmission of malaria owing to deficient asepsis. Courses of hospital treatment lasting many months involved the State in very heavy expenditure. The addicts were generally glad to be freed of their affliction by hospital treatment. There was a great danger that the peasant population would in a few decades meet with the same fate as that which overtook certain populations as a result of indulgence in alcohol.

Before the First World War the only country besides Germany to engage in the manufacture of heroin was England. Towards the end of the war, however, production was started also by Switzerland, the United States of America and Japan. In Japan, production increased from 70 kilogrammes in 1917, to 4,900 in 1920, while in 1921 a further 1,100 kilogrammes were imported. Meanwhile, heroin, which could be completely dispensed with for therapeutic purposes, had become one of the most dangerous narcotics, its use being many times more widespread than that of the others. Only the United States of America drew the right conclusion when in 1924 it prohibited the import and manufacture of heroin.

The Zürich chemist, Dr. Hefti Müller, at Basle, and the great Roessler factory at Mühlhausen took advantage of the fact that other morphine esters like benzoylmorphine or acetylpropionylmorphine, which had the same properties as diacetylmorphine, were not yet covered by the provisions of the Opium Convention. The syndicate mentioned above flooded Egypt with these products. Vienna was chosen as the trading centre, for there the penalties for violating the provisions of the Opium Convention were lowest. When an end was put to the illicit traffic from this source in 1929, two factories in Paris became the chief suppliers of the East and also of the United States of America. The French legislation then in force allowed legally manufactured narcotic products to be exported in unlimited quantities. In 1930, strict laws were enacted which made this impossible in future. The two factories (Sico, managed by Devineau and the Comptoir Central des Alcaloïdes, owned by Mechelaere), which had worked exclusively for the illicit traffic, had to close down and transferred to the Bosphorus in Turkey, which had not yet acceded to the Opium Convention. A large part of the world was then supplied with narcotics from that source. While world heroin requirements were at that time estimated at 2 tons a year, exports from these two factories, according to information supplied by the Turkish Government, amounted to 4 tons in a single half-year.

After Egypt had been flooded with narcotic products from these factories, the Government repeatedly intervened and succeeded in securing the closure of the factories and Turkey's accession to the Opium Convention.

This put an end to the illegal manufacture of narcotics in Europe. Russell Pasha, who was at that time Chief of Police, performed the inestimable service not only of freeing his own country, Egypt, from the narcotics plague, but also of making the illegal manufacture of narcotics in Europe impossible, a success which had been denied to the League of Nations for ten years.

The first serious extension of chronic morphinism was observed in Germany during the Franco-German War of 1870-71. The subcutaneous injections of morphine, which had first been used in England in the middle of the previous century, were used in the military hospitals for the first time on a large scale. Not only were they used in military hospitals to relieve severe physical pain, however, but they were also used at home particularly by neurotics as a soporific and to eliminate the mental disturbances which had been caused by the war and which the individual could not overcome out of his own resources. In this way a large number of those predisposed to addition became acquainted with the sensation of euphoria produced by morphine, an effect which formerly, when the method employed was that of administering comparatively small doses internally, as opposed to the rapid absorption of comparatively large quantities subcutaneously, was seldom produced.

Starting from Germany, the misuse of morphine spread first to France and then to England. In the United States of America also a connexion can be traced between chronic morphinism and the Civil War. The dispensing of morphine was often left to the subordinate medical staff. Since most cases of addiction arose in connexion with therapeutic treatment with morphine, morphinism was then not unjustly called a "medical disease".

It is understandable that the first victims of morphinism should have been those to whom morphine was easily accessible, that is to say, doctors and members of the healing professions, nurses, midwives, chemists and their wives. In other professions those who contracted the addiction were almost exclusively people who had experienced the sensation of euphoria while undergoing a prolonged course of treatment with morphine.

Morphinism in Germany scarcely increased after the 1880's because there was a general reluctance to use opiates and the medical prescriptions were much more strictly observed. It must also be assumed that the number of neurotics contracting the addiction was not increasing.

After the First World War the number of addicts again increased sharply because the prescriptions for the use of morphine in the military hospitals were not strictly enough observed. Thus, a large proportion of neurotics became acquainted with the sensation of euphoria produced by morphine and contracted addiction. After the end of the war morphine from plundered army stores was also easy to obtain.

That the increase was chiefly among people originally predisposed to addiction is apparent from statistics compiled at that time (Dansauer and Rieth). Of the morphine addicts who had been injured in the war 81.6 per cent had relapsed into addiction after one year, 93.9 per cent after three years and 96.7 per cent after five years. The way in which the dishabituation course was conducted made no difference to this result. On the other hand the specialist psychotherapeutic treatment following withdrawal had a great effect on the duration of the period of resistance to relapse.

The new German Narcotics Act enabled the number of chronic morphine addicts in Germany to be determined, for all prescriptions for opiates in excess of the maximum dose had to be retained in the chemists' shops. This extremely valuable material relating to the first half of 1928 has been used in a very interesting study by K. Pohlisch.

Chronic morphine addicts were considered to be those who daily and continuously consumed at least 0.1 grammes of morphine or a corresponding quantity of some morphine derivative. Pohlisch made the unexpected discovery that the number of morphine addicts was not more than 3,500-4,000, that is to say 0.56 per 10,000 of the population. To allow for possible mistakes, this figure may be raised to 0.7, and to 1.0 if the calculation is restricted to persons over 20. The incidence of addiction is not significantly related to injury during the war, for the relation between the figures for men and women (1:0.76) does not markedly differ from the normal.

The geographical distribution reveals the unfavourable influence of life in large towns on the nervous system, the figure for Berlin being 1.91; Hamburg, 1.26 and Munich, 1.13; for small towns like Bautzen, Lüneburg, Chemnitz and Neckarkreis, on the other hand, it is only 0.2. The observations at clinical hospitals show that the incidence of other psychopathic diseases is similar.

A surprisingly large number of cases are to be found among doctors. The proportion is 109 per 10,000, with only a slight difference between large towns and country municipalities. Since it cannot be supposed that the disposition to psychopathic disorders is greater among doctors than among other intellectual workers, the explanation must be that owing to the ease with which they can obtain morphine and their constant use of it, those predisposed to addiction cannot resist the temptation. The highest percentage is to be found among doctors for mental and nervous disorders, the proportion being 229 per 10,000. The explanation must

be that more neurotics devote themselves to this special study than to other branches of the profession. It is clear, however, that the accurate knowledge of the misuse of morphine which such specialist doctors must be presumed to possess is seldom able to prevent them from satisfying their morbid desire to use it.

The effects of the German Narcotics Act of 1932 have shown that the medical use of narcotics in Germany can be considerably decreased without detriment to the patients by means of strict prescriptions for the use of opiates and supervision of production and trade.

Whereas in the first quarter of 1930 medical requirements amounted to 188 kilogrammes of opium, 318 kilogrammes of morphine, 11 kilogrammes of heroin and 120 kilogrammes of cocaine, requirements in the same period of 1932 fell to 90 kilogrammes of opium, 188 kilogrammes of morphine, 1 kilogramme of heroin and 20 kilogrammes of cocaine. The number of morphine addicts also has a decisive effect on total consumption. The 4,000 morphine addicts required almost half as much morphine as the remaining population of 64 millions. Inquiries at the Vienna Federal Sickness Insurance Fund led to similar results: twenty-six chronic morphine addicts needed 40 per cent of the total requirements for 480,000 insured persons.

Opium was known to the ancient Greeks and used exclusively for its curative properties, but neither as a means of enjoyment nor as an intoxicant. The need for such substances was satisfied by alcohol and in many districts also by hashish. Only after Mahomet had forbidden indulgence in alcoholic beverages were they replaced by opium, which was eaten. Its use must have been quite general, for the Moslems introduced the custom into all countries they entered during their military campaigns. In this way it also came to Persia and India, where large areas were devoted to the cultivation of the opium poppy. Misuse of opium, however, never assumed the proportions which it assumed in China.

Opium was soon reputed to be a panacea, for at that time there were no pain-relieving sleeping aids or substances to relieve coughing. Mothers who had to go away to work during the day used it as a drug to make their unwatched children sleep, and to this the high infant mortality rate may be ascribed. Opium was a substitute not only for all the medicaments now at our disposal but also in many cases for medical treatment.

It was also the indulgence of middle age, when the desire for quiet contentment and comfortable indolence developed. The purpose was not the creation of a sensation or of an experience of euphoria, but the induction of a comfortable mood of contentment and the removal of slight physical or mental discomfort after the day's work, effects which in the case of the white race are achieved by the use of alcoholic or caffein-containing beverages and by tobacco. Occasionally it was also used as a tonic when hard physical or mental labour had to be done.

After the institution of the State monopoly, with the consequent increase in price, opium was abandoned by the masses in favour of the considerably cheaper Indian hemp, or it was replaced by alcoholic beverages mixed with chloral hydrate.

Chronic drug addicts, similar to those with whom we are familiar today, were also to be found in large towns, among the workers as well as among the upper classes.

In India also, opium and hashish were always constantly used at religious ceremonies and family celebrations, and their use was even compulsory; hence the large consumption in religious districts such as Benares for example.

Whereas in Europe chronic morphinism was confined almost exclusively to people who were mentally unbalanced, in China the misuse of opiates at times spread like an epidemic to a large proportion of a mentally sound and exceptionally hard-working population.

In China, as in Persia and India, the use of opium was customary as early as the thirteenth century. It was, however, entirely suppressed, although it had already become very widespread. Not until the eighteenth century, when tobacco impregnated with opium extracts was smoked and the subsequent prohibition of tobacco led to the production of a smokable opium, did this vice assume the proportions of an epidemic which, in spite of the severest penalties, proved to be almost ineradicable.

Smoking opium was not only a means of enjoyment, which when used in moderation did hardly more harm than our alcoholic and caffein-containing beverages or tobacco-smoking, but also a means of intoxication for the great masses of a people living under the worst possible social conditions. The social causes responsible for the spreading of the vice were therefore similar to those which at one time operated in the case of alcoholism among the working classes. Poor housing conditions, inadequate pay, lack of provision for unemployment and sickness, and also the impossibility of putting leisure to pleasant use after exhausting work and thus finding diversion and recreation, drove many to the saloon, where the money which was hardly sufficient to pay for the necessities of life was spent on drink and led to physical and moral degeneration. Since alcoholism was mostly attributable to exogenous rather than endogenous causes, it could be fought by removing those causes: by relieving the housing shortage, by improving living conditions, by instituting unemployment and sickness insurance, by providing amusement for leisure time through sport, the cinema and the radio and by raising the cultural level.

Social causes, however, do not provide an adequate explanation of the enormous extent and stubborn

persistence of this vice in China. Chinese were often willing to settle abroad only on condition that opium-smoking was allowed them. They then formed centres of infection in the countries concerned.

It must be presumed that the physiological effects of opium smoking produce psychological effects different from those of a morphine injection.

Numerous experiments, including some by the present author, have shown that not more than 10 per cent of the morphine contained in chandu passes unchanged into the smoke. How much of this is absorbed by the pleura is not known, nor is anything known about the effects of the gases released in combustion. At all events, only small quantities of morphine are immediately absorbed in smoking, whereas when subcutaneous and, particularly, intravenous injections are employed, comparatively large quantities pass into the system and simultaneously paralyse the sensitive and less sensitive centres in the cerebrum.

The small quantities of morphine which enter the blood stream as a result of smoking will, however, gradually paralyse the brain centres in the order of their sensitivity. It is extremely probable that, in the case of a highly imaginative race which thinks and writes in images, the wishes and longings that are unfulfilled in life become a living experience in dream-like visions when sensation of the outside world is excluded.

The course and consequences of the opium-smoking experience are largely affected not only by the number of pipes (thirty to forty in the case of chronic smokers) but also by personality structure, temperament and degree of culture, and not least by mood, mental employment before smoking, environment and the kind of effect which is anticipated. The sober efforts of a laboratory worker to observe and register the effects critically will therefore lead to experiences different from those of a coolie in an opium den.

The coolie has a pleasurable feeling of anticipation at the thought of the enjoyment which await him, even during the elaborate preparation of the opium pipe. After the very first pipe, weariness, hunger and thirst disappear and give way to a feeling of well-being. The train of thought is accelerated as in dreams, perception of the outside world grows fainter and fainter, the active ego is shut out so that imagination can exercise unrestricted sway set free from all the trammels of body and mind. Longings and desires are changed into imaginings which are experienced as reality and create an artificial paradise. Lastly, there sets in a deep, dreamless sleep, from which the smoker awakes in great discomfort, with a feeling of general enervation, with aching head and stomach, and often nausea, symptoms which can be removed by renewed smoking. The chronic smoking of large quantities quickly leads to a decline in capacity to work, and to physical breakdown caused by under-nourishment and disturbed digestion. The hapless victim must devote the greater part of his wages to procuring opium, for which he sacrifices everything else. When that stage is reached, he can find relief from his sufferings only in opium.

Although Europe and Japan were the chief producers of the opiates needed to satisfy medical requirements and the demands of the illicit traffic, misuse of opium in those countries never reached the same proportions as in the United States of America.

As has already been said, chronic morphinism on an epidemic scale first made its appearance in Europe after the Franco-German War of 1870-71 as a result of morphine injections. Among the civilian population too, morphine was used not only for the relief of acute pain, but also as a soporific and to alleviate neurotic complaints.

At the beginning of the century, the eating and smoking of opium were customary among certain classes, and particularly at seaports in England and also in Paris, though the vice did not spread further into the country. The sources of infection were mainly Chinese, sailors and people who had contracted the vice during their stay in the colonies.

Apart from the short period during which an attempt was made to cure morphinism by means of cocaine, cases of addiction to cocaine appeared before the First World War only in Bohemian circles in Paris and at a number of seaports. Not until the last year of the War did the drug find favour among those engaged in the fighting. At the end of the First World War, addiction to cocaine spread like an epidemic in most countries, then slowly decreased, and in 1924-25 practically disappeared. The misuse of this drug was chiefly confined to socially uprooted ex-servicemen, unemployed persons, Bohemians and prostitutes. By means of the drug they assuaged their thirst for sensation, fought against their feelings of inferiority and found a substitute for the alcohol which was so difficult to obtain. The cocaine came from plundered army stores and was available in abundance. With the return of normal conditions, the amount of addiction to cocaine became insignificant.

In the United States, the misuse of cocaine was already very widespread by 1898. In many states special laws against misuse were enacted as early as 1902. The discovery that cocaine can also be snuffed led to a sharp increase in imports. After 1905 most other narcotic drugs were displaced by heroin.

In recent decades, the misuse of marihuana (Indian hemp) became more and more widespread. As with the consumption of alcohol, its effects — the induction of ecstatic sensations of joy and paroxysms of laughter, a feeling of happiness, psychomotor excitement, the acceleration of the mental processes, the elimination of self-control, an enhanced consciousness of self, and an urge to sociability — offer a temptation not

only to neurotics but also to mentally sound persons and are an important cause of the further growth of this abuse.

Taken in conjunction with the large consumption of soporifics, the great demand for narcotic drugs cannot be a mere consequence of over-production and over-supply by the illicit traffic and must obviously have a deeper cause.

An attempt has been made to describe in outline some of the main causes of the use and misuse of drugs which affect the peripheral or central nervous systems. Some of them, such as spices, caffein-containing beverages and tobacco, are to be regarded as ordinary means of enjoyment, which can help to make life pleasanter and are scarcely likely to be misused, while others, though when used in moderation they may also be regarded as means of enjoyment, if taken in excess become poisons dangerous to the race, as in the case of alcohol among the aborigines of America and Australia, opium among the Mongolian race, the coca leaf in Peru and hashish among the populations of Asia and Africa.

The question whether a drug is to be regarded as a narcotic poison or a harmless means of enjoyment will depend on the effect which its consumption is intended to produce and on whether this effect causes a morbid desire for a repetition of the experience and hence leads to chronic misuse and addiction, as is the case with neurotics. The amount of drug addiction which there is in a country will depend on the number of neurotics among the population and on how many of these neurotics have experienced the sensation of euphoria produced by the drug, whether in consequence of therapeutic treatment with opiates or through yielding to enticement, for which over-production and the illicit traffic are to be held primarily accountable. The main cause seems to be a phenomenon of civilization caused by the enervating life of large towns and insufficient regeneration through the admixture of healthy peasant blood. The incidence of drug addiction is therefore incomparably greater in towns than in the country areas. It would be interesting to determine whether there is any relation between the distribution of the population in the large towns and the incidence of neurosis. Over-production alone cannot be the decisive factor; it comes into play only when there is a demand for illegal use. Occasional misuse leads to chronic poisoning and addiction only when there is a predisposition thereto. The enormous over-indulgence in alcoholic beverages among German university students, for example, resulted in chronic alcoholism only among those who drank such beverages to satisfy a need for intoxication or who reacted pathologically to them, while the great majority, as soon as they entered professional life, indulged in alcohol only moderately or even not at all. The case was quite similar with the epidemic of cocaine addiction which spread in most countries after the First World War, and the causes of which were exogenous, namely, the tragic post-war conditions. After order was restored, the abuse quickly disappeared or was confined to the psychopathically inclined, among whom it was then for the most part replaced by addiction to heroin.

Different conditions prevail in Africa and Asia, where a decisive part is played by tradition, poverty and bad living conditions.

If the only counter-measures employed were prohibition and strict supervision of the narcotic drugs traffic, unaccompanied by an improvement in the standard of living, the result would merely be the substitution of still more dangerous drugs, as was the case, for example, in China, where smoking opium was replaced by morphine and heroin imported by the ton from abroad.

It can therefore be assumed that in Europe and the United States of America the misuse of narcotic drugs is confined almost exclusively to people whose nervous system has sustained injury, and that the normal human being has at his disposal a sufficiency of harmless means of making life more beautiful and more worth living by material, spiritual or aesthetic pleasures.

In the case of the oriental peoples, on the other hand, the addicts are for the most part normal human beings who seek in the intoxicating effects of narcotics a temporary liberation from the troubles of their everyday life.

BIBLIOGRAPHY

Bonhoefer, *Allgemeine Zschr. für Psychiatrie*, vol. 83, 1926, p. 228.

Pohlisch, *Die Verbreitung d. chron. Opiatmissbrauches in Deutschland*. Verlag. S. Karger, Berlin, 1931.

Linz, *D. M. Wschrft.* 1932, no. 29.

Dansauer u. Rieth, *"Uber Morphinismus der Kriegsbeschädigten, Arbeit und Gesundheit*, no. 18, 1931, Verlag Reimer Hobbing, Berlin S W 61.

W. Chodzko, *Un premier cas de Codéinomanie en Pologne*, Paris, Office international d'hygiène publique. vol. XXVII, 1935, no. 12.

Bureau Central d'informations des narcotiques, *Rapport Annuel, Gouvernement égyptien*, 1930, 1931, 1932.

Participation of the Health Committee of the League of Nations in the campaign against the abuse of narcotic drugs

By Pr. Dr. Erich Knaffl-Lenz

The increasingly widespread abuse of opium caused President Theodore Roosevelt in 1908 to convene an international conference in Shanghai which discussed measures for curbing this abuse. As a result, in 1912, a second conference was convened at The Hague, at which a Convention was concluded which would have controlled the manufacture, trade, export and import and gradually suppressed the improper use of opium, morphine, cocaine and any derivatives thereof which could be misused.

The Convention did not come into effect because of the First World War and the task was therefore assigned to the newly-founded League of Nations. States Members of the League of Nations were under obligation to accede to the Convention. For this purpose an Opium Advisory Committee was established consisting of the representatives of eight States particularly interested in opium production. At a later stage a representative of Germany also took part in the meetings. The main function of this Committee was to register and supervise manufacture, imports and exports and to seize illicitly imported narcotic drugs.

In 1923 the General Assembly decided to convene a new conference to give closer definition to the provisions and also to deal with the hashish problem. In addition, medical requirements were to be determined and the production of narcotic drugs was to be limited to covering these requirements. The preparatory committee envisaged two conferences: the first to deal with the opium problem in Asia and the second with alkaloids and their production.

The Assembly was of opinion that excessive overproduction of narcotic drugs led to abuse and that one of the most urgent questions was therefore to determine the amounts needed to cover needs for medicinal world purposes so that production could be reduced accordingly.

This question was referred to a sub-committee consisting of two members of the Opium Advisory Committee and two members of the Health Committee. At its first meeting in January 1923 the following methods were proposed for ascertaining world requirements for medicinal purposes:

(1) System I. By accurate and regular methods of supervision, such as those carried out for example in the United States of America and in Germany.

(2) System II (applied, e.g., in Switzerland). By direct inquiries made in hospitals and from chemists, dispensing physicians, dentists and veterinary surgeons. From these inquiries the quantities consumed for medical purposes will be obtained.

(3) System III. By determining the extent of the incidence of diseases in any given country, taking as a basis the statistics of insurance companies and funds which insure against disease. Ascertaining from inquiries addressed to a limited number of general hospitals the average consumption of narcotics per patient and per year. By multiplying the first figure by the second, the average annual legitimate consumption throughout the country is obtained.

(4) System IV. By statistics obtained through the application of import and export certificates.

In March 1923 the writer of this article was invited to join the Health Section and asked to deal, *inter alia*, with narcotic drugs questions. The joint sub-committee, which met in September 1923, appointed him its expert.

As the methods proposed were not calculated to provide reliable consumption statistics, the expert suggested that data be obtained on the average consumption of opiates per day of treatment in general hospitals in a number of countries and that the amounts thus obtained, including morphine and its derivatives, be expressed in opium equivalents, opium being taken as 10 per cent. Commercial opium contains between 12 and 14 per cent morphine so that there is sufficient margin for losses in processing and conversion into derivatives. Codeine is not covered by the provisions of the Convention and is often not included in the statistics. Consumption varies greatly in the different countries, ranging between 25 and 75 per cent. Since three times as much codeine is needed to produce the

same result, the total consumption of opium is considerably affected. To eliminate this error in the comparison it seems advisable to reckon one-third of the codeine consumed as morphine.

Allowing for these sources of error, it appears that the consumption of opiates in countries on the same level of public health development differs only slightly. Climatic conditions may also be a factor; consumption in Sweden and England is, for instance, higher than in Central Europe.

In Belgium, Germany, Austria, Poland, Czechoslovakia and Switzerland a large section of the population has to belong to health insurance funds which defray the cost of medical treatment in and outside hospitals. The funds therefore have all the medical prescriptions. By analysing them it was possible to determine accurately the annual requirements per person insured. In Austria the consumption in 1923 under the federal health insurance scheme, which covered all civil servants and their dependants (373,517, including 204,920 children), was calculated. If opiates used in the course of hospital treatment are also included, the consumption amounted to 360 mg. of opium, 53 per cent of which was prescribed in the form of codeine.

The figures thus obtained for three Berlin health insurance funds (Allgemeine Ortskrankenkasse (Schöneberg), Betriebskrankenkasse (Berlin, 68,000 persons insured), Landeskrankenkasse (Berlin, 16,937)) were much higher, as dependants were not covered by the insurance. The highest figures were those of the Betriebskrankenkasse and the lowest those of the Landeskrankenkasse. Codeine consumption was from 50 to 100 per cent that of morphine. Similar figures were also obtained in the canton of Basle where about 80 per cent of the population was insured.

Opium consumption is greatly affected by the number of morphine addicts. Under the federal health insurance scheme in Austria twenty-six morphine cases consumed 40 per cent of the total. Investigations in Germany gave much the same results. If a further 20 per cent is added for scientific and veterinary purposes and for additional consumption of codeine, the figure comes to approximately 450 mg. of opium annually per habitant. Cocaine requirements were estimated at 7 mg. Practically no country consumes such large amounts. Only Great Britain and Sweden used considerably more. These figures were accepted by the Health Committee and put forward. If the medicinal requirements of Africa and Asia are assessed at half the amount, it would appear that world production at that time was at least ten times too great. The Opium Advisory Committee, on the basis of partially erroneous calculations, obtained the figure of 600-900 mg., but the Health Committee refused to accept it.

At this meeting the question, raised by the present writer, of prohibiting the manufacture of diacetylmorphine was discussed. Most doctors, particularly hospital physicians, consider it can be completely dispensed with for therapeutic purposes and can be replaced, with no harm to the patients, by other much less toxic morphine derivatives. Not only the physiological but also the toxic effects are three to four times greater than those of morphine. Addiction and physical and moral degeneration set in much more quickly and dehabituation is much more difficult. Its stimulative effect incites to abuse even those who are psychologically normal and it has superseded most other narcotic drugs particularly in criminal circles. Its small volume makes it particularly suitable for illicit traffic. An international ban on its manufacture, as had already been demanded by the United States, would therefore be fully justified. The Health Committee supported this view. The representatives of the Opium Advisory Committee, however, stated that the sub-committee had no power to discuss this question as they had not been asked to do so, a view contested by the members of the Health Committee. As no agreement could be reached on the matter, no further meeting of the sub-committee was held. Thereupon, the Health Committee appointed its own sub-committee to which the writer was seconded as an expert.

The International Opium Conference, convened in November 1924 at Geneva pursuant to the Assembly's decision, dealt at its first session exclusively with the opium problem in Asia. All those taking part agreed that the manufacture of smoking opium should be completely abolished and that opium smoking should gradually be suppressed. The United States demanded an annual reduction of a specific amount, whereas the colonial Powers would agree only to a gradual reduction. As no agreement could be reached on the point, the United States representatives left the conference and took no further part in the meetings.

The second conference in 1925 dealt exclusively with medicinal opium, morphine and its derivatives, cocaine and ecgonine and, lastly, with hashish extracts and tinctures. All these drugs were brought under the provisions of the Convention with the exception of pharmaceutical preparations containing less than 0.2 per cent morphine and 0.1 per cent cocaine. On the other hand, all preparations containing diacetylmorphine were put under control.

The exceptions thus made are not justifiable from the medical point of view as the preparations in question are of very doubtful therapeutic value and could be prescribed by doctors at any time and then brought under the provisions. In the first place, these provisions allow unknown quantities of narcotic drugs to escape control and registration and in the second place, they make it possible to isolate the pure alkaloids and introduce them into the illicit traffic.

Two articles of the Convention provided for cooperation between the Health Committee and the Permanent Committee of the Office International de l'Hygiène publique in Paris. Paragraph 8 lays down that narcotic drugs, which, because of being com-

pounded with other substances can no longer be used for improper purposes, may be exempted from the provisions of the Convention.

Article 10 of the Convention provides that drugs to which it does not yet apply, may be included in the Convention if they have habit-forming properties or if they can be transformed into habit-forming substances. In both cases the Health Committee requests the Permanent Committee in Paris for its opinion on the matter. A permanent committee of experts was accordingly set up to deal with these questions. After the Health Committee in Geneva had accepted the proposals, the Council was informed accordingly and it notified the member States.

The effect of this complicated procedure was that it took from one to one and a half years to secure a final decision. It would have been more advisable to make the provisions applicable to new morphine derivatives while they were being examined by the committee of experts. The 1931 Convention provides for a similar procedure.

Under article 10 a series of new morphine derivatives with habit-forming properties could be subjected to the same control as morphine. These were dihydrohydrooxycodeinone (eucodal), dihydrocodeinone (dicodide) and its acetyl ester (acedicone) and dihydromorphinone (dilaudide).

At the end of the 1920's very large quantities of morphine esters were being produced in two countries not parties to the Convention exclusively for the illicit traffic. They contributed largely to the narcotic drug epidemic in Egypt. The drugs in question were benzoylmorphine and acetylpropionylmorphine (dionyl). They were also brought under the Convention.

As previous experience showed that all morphine esters produced similar effects to those of heroin and could be reconverted into morphine by saponification, the present writer proposed that all esters, including those not yet produced, should be treated in the same way as heroin, a view with which the Health Committee agreed. But non-expert circles in the Opium Advisory Committee doubted whether this view was correct. It was also objected that the provisions of the Convention could not be applied to a series of subtances. The Health Committee declined to deal with the point, claiming that it was a juridical question outside its competence, and maintained its point of view.

In the United States a morphine derivative, dihydrooxymorphine-D, very similar to dilaudide, was synthesized by Dr. Small and was considered to be non-habit-forming, although it had the same analgesic properties as morphine. Subsequent investigations made in the United States showed, however, that it was also habit-forming and its use and manufacture were prohibited. In view of the great importance which a derivative producing similar effects to those of morphine without being habit-forming would have, the Opium Advisory Committee requested the Health Committee for its opinion. The experts of the Office were therefore asked to examine the question. Straub (Munich) showed by experiments on mice that the sedative and stimulative effects were similar to those of morphine but ten times stronger. Tieffenau (Paris) was able to prove by experiments on dogs that desomorphine had similar but much stronger effects than morphine and that habituation supervened more quickly. The writer found from experiments on mice that both its effects and its toxicity were much greater than those of morphine. Experiments on rabbits proved that the sedative effect on the respiratory centre was also greater, though of much shorter duration. Experiments on an addict suffering from cancer showed that withdrawal symptoms could be eliminated by using even small doses, but that the effect was only short-lived. The tests therefore confirmed the view of the American experts that a ban on manufacture was justified.

The Opium Advisory Committee considered it absolutely necessary to devise an international method of measuring morphine and cocaine quantitatively. The Health Committee set up an international expert committee of pharmaceutical chemists to study this question, of which the present writer was a member. It proved possible to solve the problem of determining the amounts of cocaine and ecgonine very satisfactorily but this was not so in the case of morphine. As most chemists use the so-called calcium method, whereby morphine is extracted from raw opium in the form of calcium morphinate, most of the committee members felt that this method should be retained but that its intrinsic defects should be overcome. The feeling was that some method could probably be evolved which would permit the quantitative isolation but not the quantitative extraction of pure morphine, so that a relatively higher empirical correction factor had to be used. A method proposed by Eder, which avoids this error, proved to be too lengthy for practical purposes and could also not be given a further test as the committee had to stop its work. A method proposed by the writer at the last meeting could also not be taken into consideration. It has latterly been further developed and published under reference St/SOA/Ser.-K/3 I.VIII.52.

The second opium conference at Geneva in 1925 did not discuss the question of determining world requirements of narcotic drugs, as it considered the figures computed by the Health Committee to be insufficiently based.

No solution to the heroin problem was found either as the conference did not consider itself competent to take such action.

On the writer's initiative the Austrian Government proposed, at the 1931 Conference on the Limitation of the Manufacture of Narcotic Drugs, that the manufacture of heroin from opium should be reduced and the question should be referred first to the technical

committee for an expert opinion on the harmful effects of diacetylmorphine and on the possibility of dispensing with its use in therapeutics to be obtained from the committee of experts placed at the disposal of the Conference. This committee consisted of leading experts from Germany, France, Great Britain and included the present writer.

Both proposals met with the stiffest resistance from the producing countries, whereas Poland, the United States, Italy and China supported it warmly. Finally, after long discussions, it was decided to refer the matter to the technical committee. Simultaneously, Poland submitted a proposal to prohibit exports in case the proposal was rejected. The Austrian delegation asked the experts in the technical committee to produce replies to the following questions:

(1) What are the properties of diacetylmorphine which make it particularly suitable for use as a narcotic drug and in the illicit traffic?

(2) What are the therapeutic advantages of diacetylmorphine as compared with morphine and other morphine derivatives?

(3) Are the properties of diacetylmorphine such that they cannot be replaced by other medicaments without harming the patient?

(4) Are the dangers which diacetylmorphine constitute for mankind not incomparably greater than the advantages of its use in therapeutics?

After the expert committee had confirmed in document Conf. L.F.S. Com. techn. the extremely harmful effects of diacetylmorphine and had replied in the affirmative that it could perfectly well be replaced by other less harmful morphine derivatives, the Austrian delegation pressed strongly for acceptance of its proposal. Objections, however, were raised by some of the producing countries, particularly France and Great Britain, which emphasized that it would be inhuman to deprive chronic invalids of this valuable medicament and that such far-reaching decisions could not be adopted without consulting the medical bodies in the various countries. The British expert, Professor Dixon (Cambridge), brilliantly refuted the objections raised by medical laymen.

In spite of the finding returned by the committee of experts and the unhappy experiences in Egypt, the proposal was rejected by a tie-vote, and the Polish proposal to prohibit exports came up for discussion. In view of the great danger that this proposal might also be rejected, the Austrian delegation proposed, particularly in order to counteract the French objection that poor patients should not be deprived of this medicament, that the governments of countries which did not themselves produce heroin, should be allowed to import the amounts they needed but must keep them in their own charge. This joint Polish-Austrian proposal was strongly contested but was finally adopted by 10 votes to 5, with 2 abstentions. It was also adopted at the plenary meeting and incorporated in article 10 of the Convention.

Time has shown that this provision could do nothing to prevent the abuse of heroin.

It would be desirable that at a future conference only the views of medical experts should be taken into account on purely medical matters. An international ban on the manufacture of heroin, which can be easily produced from morphine with no special technical knowledge, would be successful only if draconic sentences, such as the confiscation of property, deportation or several years' hard labour, were introduced for the manufacture or possession of, or traffic in, the drug. It should also be considered whether the manufacture and traffic should not be classified as crimes againts humanity.

This attitude would seem justified in view of the heroin epidemic in Egypt.

These brief observations show that the Health Committee of the League of Nations has, within the limits of the provisions of the 1925 Geneva Convention, made a very valuable contribution to the campaign against the abuse of narcotic drugs.

Bibliography

League of Nations publications:
C.10.M.7, C.213.M.69, C.224.M.80, C.579.M.205.
CH.158, 176, 233, 237, 228, 308, 314, 548, 604, 671, 674.
CH. OC mixte 7, OC CH/S.C mixte/P.V.2.
CH/Opium C/P.V.I. P.C.C. I.

Extract from the monthly bulletin of the Office international d'hygiène publique, vol. XXX, 1938, fasc. no. II, p. 2562.

The Need for Studying the Problem of Coca-Leaf Chewing

By Pr. Dr. Carlos Monge M.

The following article has been written by Professor Dr. Carlos Monge M., one of the outstanding authorities on the problem of the coca-leaf chewing, founder of the Instituto Nacional de Biología Andina *for the study of the Andean man. Pr. Monge states his position and refutes what he considers to have been misrepresentations of it: he concludes that the problem of coca-leaf chewing has not yet been fully investigated from a scientific, economic and social point of view.*

I wish to thank the Division of Narcotics Drugs of the United Nations Secretariat for having kindly asked me to put forward my ideas on the problem of coca-leaf chewing. Those ideas have often been distorted, particularly in Peruvian publications, and such distortions may have played a role in forming the opinion of the experts. I should like to remind them respectfully that they ought to turn to the original documents which have been written by me and not to articles or studies in which the truth has been twisted. To give a concrete example, let me observe that in a recent issue of the *Bulletin on Narcotics* (vol. IV, no. 2, April-June 1952) which was placed before the Commission on Narcotic Drugs, there is an article entitled "The Problem of the Chewing of the Coca Leaf in Peru" containing the following sentence (page 31 of the English edition): "It is affirmed that the inhabitant of the Andes is a distinct being, physically and chemically; that he forms a whole with the environment in which he lives and to which he is perfectly adapted; that he constitutes a climatic and physiological variety of the human race, etc., *and that while other races do not need coca, to the Andean it is indispensable.*" The bibliographical reference for this citation is the following: "C. Monge: El problema de la coca en el Perú, *Anales de la Facultad de Medicina,* T. XXIX, p. 311, 1946". It is sufficient for me to say that the last assertion (italicized above) which is attributed to me, is absolutely false. It is nowhere to be found in the article just referred to, nor is it to be found in any publication of the author of these lines. As this remark has been attributed to me on several occasions in various articles either by the same author, or by others sharing his outlook, one understands how such fanciful opinions on the problem of coca-leaf chewing have helped to mislead the judgment of those interested in the subject. I do not believe this attitude is malicious, but rather irresponsible, as is characteristic of popular literature on scientific matters.

It is true that, in Peru, there have always been two standpoints from which the effect produced on the human organism by the consumption of coca leaves has been judged. For Hipólito Unánue, the founder of medical studies in Peru at the end of the eighteenth century, coca was the sacred plant of the Incas, whose consumption at high altitudes was beneficial. For many Peruvian investigators, including Luis Sáenz whose reputation as a physician is well known, the coca leaf causes grave disorders, both physical and psychical. I have always taken great pains when giving my opinion on a certain question to respect adverse opinion and to rely only on original documents. Nor have I ever doubted the honesty of serious investigators of this complex problem, and I still believe that every opinion deserves respect if it is based on a sincere attempt to weigh the facts. And here I am referring not only to Peruvian authors, but also to foreigners and, especially, to those experts of the United Nations who came in an official capacity to Peru to investigate the question. I certainly do not mean to say that I am in agreement with the conclusions arrived at by others, but rather that I maintain my right to reach independent conclusions on the basis of the facts that have been established and on others which I have uncovered or that have been brought to light by reputable scientists of unquestionable integrity. If my opinion which is derived from a study of the above-mentioned facts differs from that of others, it is simply a difference of interpretation, of selecting a criterion, and of deciding upon what is true.

I may emphasize that there is a third approach to the problem on the basis of which I founded the Instituto Nacional de Biología Andina for the study of the Andean man, of the diseases of that region and *of the use of coca leaf* (Supreme By-Law of 1940). The grounds which have led us to adopt this third approach since we began our studies on life at high altitudes are the following:

(A) Symptoms of drug addiction are not found among those who chew coca leaves; this statement is

confirmed in the report of the Commission of the United Nations.

(B) No appreciable clinical syndrome appears when coca is no longer taken.

(C) Thousands of conscripted men who join the army each year, drop the coca habit immediately and do not seem to resume their chewing when on leave (there is no legal prohibition in Peru).

(D) In many areas, the women do not chew the coca leaf, and even the habitual chewers themselves abstain during festival days.

(E) The habit is maintained by the Andean man who only comes down occasionally to sea-level, but is easily given up when he settles at a lower altitude; and also sometimes when he leaves his rural occupation to enter domestic service.

(F) There is a direct relationship between altitude and the chewing habit: it is most widespread at 15,000 feet; at the altitude of 7,000-8,000 feet, however, it is seldom encountered; at sea-level it is the exception.

(G) In the hot valleys where coca is produced, coca chewing is also very rare.

In facing these facts, i.e., the harmlessness of coca, the absence of any craving for it, and the ease with which the habit can be dropped, one is drawn naturally to this third approach, that is to investigate the problem scientifically in all its aspects: medical, pharmacological, physiological and economico-social. This has been the policy of the Instituto, which because of its scientific character has had to proceed carefully. Indeed the Peruvian Government has adopted this approach in its study of the problem, in view of its controversial character. This was also the standpoint of the present writer, a standpoint which he defined in his article in the *Anales de la Facultad de Medicina* of 1946, mentioned above, and which he adopted before the United Nations concerned itself with the problem; it is this standpoint which explains the positions that he took subsequently.

Medically speaking, there are still two apparently irreconcilable clinical points of view: there are those who believe that the coca leaf causes drug addiction and there are those who deny it. One might add a third: that of the members of the United Nations Commission of Enquiry who affirm that coca-leaf chewing is not an addiction, but that it should be treated as such because it is a harmful habit. Finally, the World Health Organization has handed down its opinion (WHO Technical Report, no. 57, 1952) without investigating the practice *in situ*, that it is an addiction, basing itself on the report of the United Nations Commission which affirms that it is not.

It is very clear that this problem does not lend itself to easy explanations, as someone remarked at the last session of the Commission on Narcotic Drugs, and those delegates who find it difficult to decide between these contradictory opinions should confine themselves to discreet observations. And I believe that the Instituto Nacional de Biología Andina was quite right in recommending a scientific study of the problem.

With regard to the physiological study of the Andean man and the deviations of biological reactions to the effect of remedies at high altitude — an extremely important question, requiring very precise experiments — we can emphatically affirm that Andean man is a climato-physiological variety of the human race. A few days after the last meeting of the Commission on Narcotic Drugs, I was invited to an International Congress on Anthropology, organized by the Wenner-Gren Foundation in New York, in order to develop the theme of "Biological Bases of Human Behaviour" on the high plateaux of Peru. This is not the place to review the scientific discoveries of the Peruvian school of medicine. It will suffice to mention that they were of such importance that the United States sent fifty-two specialized research workers by air to take part in the Symposium de Biología de Altitud, organized by the Instituto Peruano de Biología Andina (1949) at the request of UNESCO; that the International Council of Scientific Unions (ICSU) named an International Mixed Committee for the study of the physics and biology of altitude, and finally, that a few days ago, the Director of Personnel of the Randolph Field School of Aviation Medicine arrived in Peru to participate in the research of the members of the Instituto Nacional de Biología Andina and to take part in their investigations. We wish, accordingly, to emphasize that there exists a physiology of altitude, until recently unknown to the experts who have always based their research on the official science dealing with observations made at sea level, that this physiology affects pharmacological reactions at high altitudes, and that, as has been repeatedly pointed out, it is ignorance of this fact that has been responsible for numberless errors.

From the point of view of pharmacology, the splendid work done in the Andean altiplano by Aste-Salazar has helped to prove that the problem is more complicated than it had at first seemed, because the quantities of cocaine found in the blood as a result of chewing the coca leaf are really insignificant (½ thousandth of a milligramme). This discovery reveals the existence of unsuspected biochemical (perhaps enzymatic?) processes, but it cannot lead us to assert that the action of coca-chewing is beneficial or harmful. That is another question in the unexplored field of the biology of altitude. "On this point, one may say that there is a possibility that, at high altitudes, in an extreme state of anorexia, the effect of coca could act as an agent reinforcing humoral reactions, in such a way as to avoid fatigue and to augment an individual's capacity to produce. *This then is a working hypothesis which is at present being tested by the members of the Instituto de*

Biología Andina." I take pleasure in repeating the final sentences of my 1946 article, which reproduce clearly the basic premise in accordance with which I have long been studying this problem.

The economic and social aspect of this question plays without doubt the principal role both in the habit's development and in its disappearance. In that respect I have had the good fortune as director of the Instituto Indigenista Peruano of concluding an agreement with Cornell University, which aims at developing a programme of cultural development on the Peruvian altiplano. The Peru-Cornell project, which is now in operation after three years of on-the-spot preparatory work directed by Dr. Allan R. Holmberg, Professor of Anthropology at Cornell University, is studying coca-leaf chewing from the economic and social point of view. It can thereby be seen that the Government of Peru, following a consistent policy, sought to have this problem examined from the sociological aspect.

I may add that an experiment was undertaken at an altitude of 10,000 feet with the assistance of volunteers and when coca was replaced by a system of well-balanced meals for over a ten-day period, it was found that it was possible to stop the consumption of coca. Besides, the number of volunteers was so large that it had to be limited to the groups under study. It must be added, finally, that the inhabitants of the zone where the experiments were carried out are strong, well fed and have a good labour output. These facts, communicated personally to me by Dr. Allan R. Holmberg, indicate plainly the absence of addiction. They also lead to the conclusion that, if the problem is to be comprehensively studied, many experiments are necessary at various altitudes, but especially at high altitudes, to determine the effects of coca on labour output: in short, whether it reduces or increases productivity.

It is evident, if one recalls the discussion on this problem at the last session of the Commission on Narcotic Drugs, that a better method must be found if we want to reach a solution; the effect of coca-leaf chewing must be the object of a careful investigation.

I have traced the broad outline of an economic and social experiment which the Government of Peru has undertaken and in which I had the good fortune to participate, faithful to an impersonal policy free of prejudice, searching for the truth. I must point out that following the adjournment of the question by the Commission on Narcotic Drugs at its 1950 session, a deadlock has been reached, in view of the seemingly irreconcilable opinions of the United Nations Commission on the one hand and of the Peruvian Government on the other. It is necessary to break that deadlock. Mr. Léon Steinig during his visit to Peru in 1951 cleverly laid the foundations for a solution which was then adopted even without discussion by the members of the Peruvian Committee on Coca. That was a triumph, which enhanced the prestige of the Commission on Narcotic Drugs and of the United Nations and enabled it to come to an agreement, which permitted everyone, working together towards a common goal to seek out the truth and to act accordingly. Now if things turn out badly and if the habit is proved to be harmful, no unfortunate measures will be taken such as the prohibition of alcoholic beverages which did so much harm to the morale of a certain people who learned thereby that the law could be flouted. Aristotle once wrote that governments must be wary of imposing measures that their peoples are not able to accept.

In conclusion, this entire problem of coca-leaf chewing must be the object of scientific, economic and social investigation, in order to arrive at an incontestably well-established conclusion pointing the way to future action.

Studies on the Identification of Narcotics, III. Microcrystal and Colour Tests for the New Synthetic Narcotics*

By Charles G. Farmilo, Ph.D., Leo Levi, Ph.D., P. M. L. Oestreicher, B.A., and R. J. Ross

This article is a continuation of the one that appeared in the Bulletin *(vol. II, No. 2, April 1950). It was prepared by Drs. Charles G. Farmilo and L. Levi and Mrs. P. M. L. Oestreicher, B.A., chemists of the Organic Chemistry and Narcotic Section, Food and Drug Laboratories, Department of National Health and Welfare, Ottawa (Canada), and Mr. R. J. Ross, supervisor of the Special Effects Division, National Film Board of Canada, also at Ottawa. These studies will be of great value to narcotics enforcement chemists in identifying the new synthetics.*

Introduction

A number of synthetic narcotics have recently been added to the schedule of the Canadian Opium and Narcotic Drug Act, 1929, by the Division of Narcotic Control, acting under the international treaty known as the 1948 Protocol. These synthetic drugs had been found to possess addiction liability similar to that of morphine by the Expert Committee on Drugs Liable to Produce Addiction of the World Health Organization. It is essential that drug analysts be prepared to identify these drugs now that they are covered by the Opium and Narcotic Drugs Laws, and research into the chemistry of their identification has been carried on in this laboratory to obtain and provide microchemical tests for this purpose.

The synthetics which may be encountered as illicit seizures are: methadone, pipidone, phenadoxone; pethidine, hydroxypethidine, ketobemidone, alphaprodine; methorphinan and metopon. The last-mentioned substance, metopon, is manufactured from natural thebaine, while the others are completely synthetic. Methadone, pethidine, methorphinan and metopon are commercially available in Canada; phenadoxone and pipidone are made in England; and ketobemidone is being sold in Denmark and Switzerland, under at least one trade name that we know of — Cliradon. Ketobemidone has been banned from production and sale in the United States and Canada because of its extremely dangerous addiction properties. Ketobemidone is potentially the most dangerous narcotic which has been synthesized up to the present time. Withdrawal symptoms from this material are so intense that they are liable to cause death, according to results found by Dr. Harris Isbell at the Lexington Drug Addiction Research Centre.[23*]

The purpose of this study was to discover satisfactory tests — and, so far as possible, the best tests — for microcrystal identification of a number of the new synthetic narcotics. Many reagents were tried out on a 0.1 per cent solution of each of the nine narcotics studied, and the more sensitive reagents were also tried at 0.05 per cent concentration of the narcotic. Whenever crystals were obtained in the survey, the reaction was studied further, as hereafter described. The investigation lasted several months and at least one good test was found for each of these narcotics.

Another purpose of this paper is to compare some common colour reactions of a number of narcotics with those of the new synthetics. The following spot plate reactions have been studied and results with thirty-four narcotics are reported: Marquis',[31] Mecke's,[32] Wassicky's,[41] Froehde's,[12] Zernik's[45] and Flueckiger's.[11] A few special colour reactions for metopon, pethidine and methadone have been previously described [9, 5, 7] and are briefly reviewed in the present paper.

As far as the authors have been able to learn, for four of these nine narcotics there has been no previous publication of any article dealing particularly with their identification as it may have to be made by narcotic or drug chemists. These four are: hydroxypethidine, alphaprodine, ketobemidone and methorphinan. For metopon, colour tests were previously given, in the first article of this series[9] and the crystal reactions given here are the first reported crystal tests. For phenadoxone (under its trade name of Heptalgin), and for pipidone, one microcrystal test for each was given in the second article of this series.[10] Recently another reaction of phenadoxone has been mentioned.[7] The remaining two substances, methadone (amidone, polamidon) and pethidine (dolantin, demerol, etc.) have been previously studied by a number of investigators,

* Superior figures refer to the references at the end of the article. See references 9 and 10 in article in the *Bulletin*, vol. II, no. 2, April 1950.

including two of the present authors.[5, 7, 8, 9, 10, 27, 24, 21, 18, 37, 28, 29, 22, 39, 44] The various recommendations are discussed below. Two more tests for pethidine which are new, though obtained with previously known reagents, are illustrated here; and for methadone one test which has been highly recommended before, but not previously photographed, and one test which employs a new reagent.

A. Experimental procedures for microcrystal reactions

Before beginning a study of identification reactions of the various new synthetics it will be valuable to place them in chemical relationship with each other. The additional classification, shown in table I, of synonyms is intended to help organize in future innumerable potentially dangerous drugs and collect their proper chemical names which may be required to be shown on the certificate of analysis. Chart I shows the chemical structures and three classes to which these drugs belong. Table I shows the chemical names of the substances named from their formulas in chart I according to the Rules of the International Union of Chemistry as given in Patterson's *Ring Index*.[33]

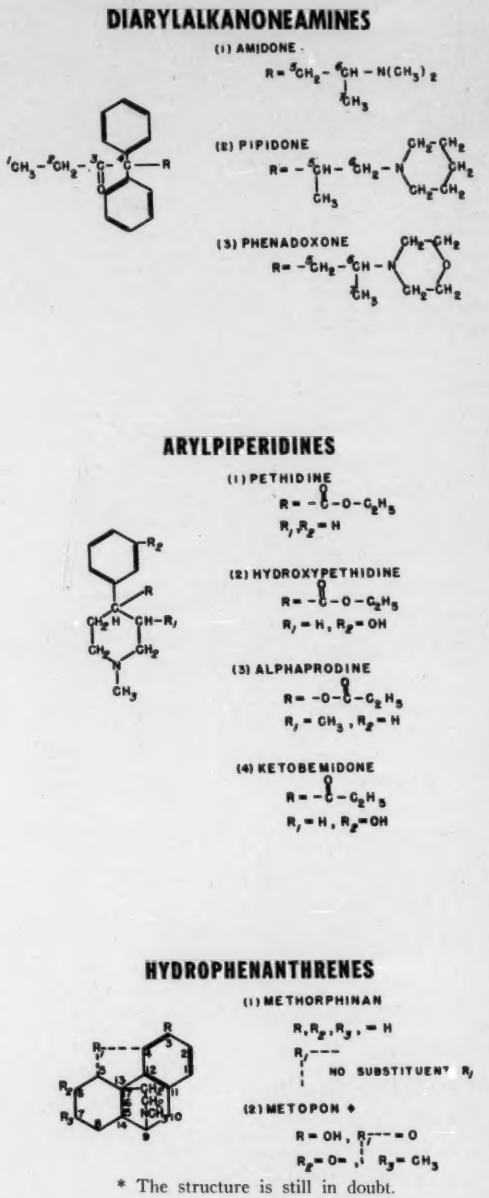
Materials

The narcotics investigated in this study were obtained from the following sources of supply: physeptone hydrochloride brand of amidone hydrochloride (methadone hydrochloride) and also pipidone hydrochloride: Burroughs Wellcome and Co., 183-193 Euston Road, London, N.W.1, England; heptalgin hydrochloride brand of phenadoxone hydrochloride: Glaxo Laboratories, Ltd., Greenford, Middlesex, England; demerol hydrochloride brand of meperidine hydrochloride (pethidine hydrochloride): Winthrop-Stearns Inc., Windsor, Ontario; metopon hydrochloride: Parke, Davis and Co., Walkerville, Ontario; dromoran hydrobromide brand of methorphinan (dl-3-hydroxy-N-methyl-morphinan) hydrobromide and also nisentil hydrochloride brand of prisilidene hydrochloride (alphaprodine hydrochloride): Hoffman-LaRoche, Nutley, New Jersey; cliradon hydrochloride brand of ketobemidone hydrochloride, and bemidone hydrochloride (hydroxypethidine hydrochloride): Ciba, Ltd., Basle, Switzerland.

Preparation of narcotic solutions

Solutions of the narcotic salts were prepared by dissolving the salt (0.25 g.) in a minimum amount of water and made up to volume in a volumetric flask (25 ml.). Each stock solution was then diluted as follows: to each of ten soft glass bottles (25 ml. capacity), fitted with plastic screw caps, rubber bulb and dropping pipette, was added 5 ml. of water, then 5 ml. stock solution was pipetted into the first bottle, capped and shaken. Some of this solution (5 ml.) was then pipetted into a second bottle containing water

Chart I



* The structure is still in doubt.

Table I

List of Synthetic Narcotics with Chemical Names, Synonyms and Trade Names

(See "Estimated World Requirements of Narcotic Drugs in 1952", E/DSB/9 Geneva 1951)

DIARYLALKANONEAMINES

1. *Methadone*[a]
dl-4,4-diphenyl-6-dimethylamino-heptanone-3; adanon, amidone, amidosan, AN-148, butalgin, depridol, draminon, dia-

none, dolafin, dolamid, dolophine, dorexol, heptadon, heptanal, heptanol, Hoechst 10820, ketalgin(e), mecodin(e), mephenon(e), miadone, moheptan, physeptone, physopeptone, polamidon, symoron, turanone.

2. *Pipidone*

4,4-diphenyl-6-piperidino-5-methylhexanone-3; G.B. (poison list) P.1.S.1.

3. *Phenadoxone*[a]

4,4-diphenyl-6-morpholino-heptanone-3; C.B.-11, hepagin, heptalgin, heptalin, heptazone.

ARYLPIPERIDINES

1. *Pethidine*[a]

Ethyl-1-methyl-4-phenylpiperidine-4-carboxylate; antiduol, avlon, centralgin, D-140, demerol, dispadol, dodonal, dolantal, dolantin, dolantol, dolaren, dolarin, dolatol, dolental, dolinal, dolopethin, dolosal, dolvanol, endolat, felidin, gratidina, isonipecaine, meperidin(e), mephedine, pantalgine, piridosal, precedyl, sauteralgyl.

2. *Alphaprodine*

α-1,3-dimethyl-4-phenyl-4-propionoxypiperidine; nisentil, Nu-1196, prisilidene.

3. *Hydroxypethidine*

Ethyl-1-methyl-4-(m-hydroxyphenyl) piperidine-4-carboxylate; bemidone, Hoechst 10446, win. 771.

4. *Ketobemidone*[a]

1-Methyl-4-(m-hydroxyphenyl)-4-piperidyl ethyl ketone; cliradon, ceto-bemidone, Hoechst 10720, win 1539.

HYDROPHENANTHRENES

1. *Morphinan*

N-methyl-9,13-iminoethano-octahydrophenanthrene.

2. *Methorphinan*

N-methyl-9,13-iminoethano-3-hydroxyoctahydrophenanthrene; 3-hydroxy-N-methylmorphinan, dromoran, NU-2206.

3. *Metopon*

N-methyl-9,13-iminoethano-7-methylhexahydro-6-ketophenanthro (4, 5, 12, 13) furan.[b]

[a] International non-proprietary name adopted by the World Health Organization.

[b] Metopon has not been completely determined structurally. The position of the methyl group (C-7 or C-5) is still in doubt. Formula in chart I based on structure suggested by Small[32] uses the Cahn-Robinson numbering system.

(5 ml.) capped and shaken. The process was repeated until ten such serial dilutions had been made. The bottles were then labelled showing the narcotic name, concentration and date of preparation.

Preparation of reagents particularly mentioned hereafter

(1) *Basic reagents*

Trisodium phosphate and ammonium carbonate were prepared by dissolving reagent grade chemicals in water. A 5 per cent weight by volume solution was used in each case. Ammonium hydroxide was diluted to a 5 per cent solution. Disodium monomethyl arsonate, $Na_2CH_3AsO_2.5H_2O$ (arrhenal), purchased from Mann Fine Chemical Inc., 136 Liberty St., N.Y. 6, N.Y., was used as a 5 per cent aqueous solution. This reagent was recommended by Denoel and Soulet[6] for morphine, dicodid, dilaudid and eucodal.

(2) *Halogen reagents*

Iodine in HBr: iodine — 1 g. HBr (40 per cent) — 25 ml. Let stand, with occasional shaking, until the iodine has all dissolved. (This takes several days). Then add 75 ml. water.[15, 18]

(3) *Acidic or metathetic reagents*

Chromium sulfate chloride, $CrSO_4Cl$: chromic sulfate, $Cr_2(SO_4)_3.XH_2O$ (7 g.) was placed in water in a mortar (50 ml.) and triturated thoroughly, then chromic chloride, $CrCl_3.6H_2O$ (3 g.) was added to the mortar with stirring. Concentrated hydrochloric acid (7 ml.) was then added. The solution and undissolved crystals were then rinsed into an Erlenmeyer flask (500 ml.) with an additional 35 ml. of water and heated on a steam bath for about ten minutes. Sulfuric acid (1 vol. H_2O: 1 vol. conc. H_2SO_4) (8 ml.) was then added to the chromic salts in solution and refluxed about forty minutes. The solution was cooled and transferred to a glass-stoppered bottle for storage. It was found impossible to make this reagent with another brand of chromium sulfate, $Cr_2(SO_4)_3.15H_2O$. Its properties seem to depend on particular characteristics of the chromium sulfate used, which was "Baker's Analysed". Originally prepared by Fulton and Williams.[18]

Mercuric bromide and HCl: 5 g. $HgBr_2$ in 22 ml. concentrated HCl and 78 ml. water.[18]

Chlorauric acid in acetic acid:[18] this reagent was prepared by dissolving 1 part of $HAuCl_4.4\ H_2O$ crystals in sixty parts of dilute acetic acid (2 acid: 1 water).

Chloroplatinic acid with HCl: chloroplatinic acid crystals (2 g.) were dissolved in hydrochloric acid (15 ml. of 20 vol. per cent HCl).[15, 18]

Bromauric acid, $HAuBr_4$: chlorauric acid crystals (5 g.) and sodium bromide (5 g.) were dissolved in water (100 ml.). The reagent is a deep red colour.[14]

Bromauric acid in concentrated HCl; chlorauric acid crystals (5 g.) were added to hydrobromic acid (7.5 ml. 40 per cent) and hydrochloric acid (92.5 ml. 37 per cent).[15]

Potassium lead iodide: Martini's reagent[30] was prepared by adding enough saturated solution of potassium iodide to a lead nitrate (1 per cent) solution to dissolve the yellow precipitate that first forms. The solution is then clear and slightly yellow.

Sodium lead iodide: sodium iodide (100 g.) and lead acetate (3 g.) were added to water (60 ml.).[13] For test purposes, if the reagent and narcotic solution are added in equal proportions, lead tetraiodide may precipitate, but another drop of the reagent will redissolve this type of precipitate.

Sodium silver iodide: silver nitrate (5 g.) and sodium iodide (75 g.) were dissolved in water (100 ml.).[13] With much dilution, silver iodide may be precipitated from this solution, therefore equal portions of the alkaloid and reagent should be used. Precipitated AgI should redissolve.

Potassium thorium iodide: thorium nitrate (1 g.) and potassium iodide (10 g.) were dissolved in water.

This reagent for methadone is new and is of special interest in that thorium is apparently outside the group of metals indicated by Fulton as forming double halides effective as alkaloidal precipitants.[15]

Reinecke's salt, ammonium diammine chromium tetrathiocyanate, $NH_4(NH_3)_2Cr(SCN)_4$: the salt was dissolved in water (15 ml.) until a saturated solution (about 1.5 per cent) was obtained. Reinecke's salt can be obtained commercially. The solution has to be fairly fresh. The reagent is used extensively by Rosenthaler.[34]

Sodium mercuric nitrite, $Na_2Hg(NO_2)_4$: mercuric nitrate (5 g.) and sodium nitrite (4 g.) were added to water (100 ml.). A few drops of nitric acid were added to make a clear solution. It is necessary to use 3 to 7 g. of sodium nitrite in the reagent for optimum sensitivity.[13]

(4) *Organic reagents*

Picric acid, $2,4,6\text{-}(NO_3)_3C_6H_2OH$: picric acid (1 g.) in water (100 ml.) was used as a reagent.

Picric acid (alcoholic) — 2 per cent.

Picrolonic acid, $NO_2C_6H_4NN:C(CH_3)C(NO_2):COH$

a saturated aqueous solution was used.[34, 39]

Methods for performing and assessing microchemical reactions

The microchemical reactions between the alkaloid and reagent were carried out as follows:

Microscope slides were set out on a black background to facilitate observation of the precipitate. One or more drops of narcotic solution were placed on the slide and the reagent added on top of the narcotic solution. The slide was left undisturbed for about ten minutes or until crystallization had occurred.

The crystalline products were examined under the microscope. Eight criteria, shown in table III, similar to those given by Fulton,[18] were used for comparing and judging the crystal reactions obtained and examined under the microscope. These criteria concern the complete microchemical reaction, reactants, conditions and products. The products may be either crystalline or amorphous, and the criteria apply to crystalline products.

Since analysts identify the reactants (A) or narcotic in a microchemical reaction on the basis of microscopic physical appearance of the product, it is obvious that this microcrystal product must fulfil the requirements of criteria (1) and (2) in table III. The crystal *form*[a] and *habit*[a] must be easily obtained, reproducible and characteristic, and these terms can be defined exactly as follows: crystal faces which are alike constitute a *form*[a] (geometrical), several such forms may be combined (in one face), though ordinarily only a few are represented in one product, or microscopic crystal. When a crystal grows freely in all directions the forms which it exhibits represented by faces of different shapes and sizes constitute a *habit*.[a] Ideal crystal forms are usually obtained under conditions of very slow and uniform growth. Crystals developing under meta-stable conditions (supersaturation) tend to grow fastest at their angles, maintaining a few faces and a simple habit. Distortion of crystals may be avoided by growth of crystals suspended in a liquid drop, as in the case of material precipitated by metathetical reactions between reactant solutions. If the growth of the crystal upward is restricted by covers the crystals are flattened and distorted. It is thus necessary to specify the reaction conditions under which the crystals grow (criteria 4 and 5).

Another criterion which was used in assessing the value of the reagent was the sensitivity of the reagent. In order to compare the sensitivity of the reagents a comparison of the precipitating power of the reagent with that of phosphomolybdic acid was made according to the method described by Fulton.[14] This method enabled the relative sensitivity of reagents to be compared one with another.

Sensitivity measurements of the reagents were performed as follows: the microscope slides were arranged in front of the bottles containing narcotic solutions to maintain the correct concentration order. Phosphomolybdic acid solution was used as a reagent for determining the sensitivity and solution number. The reagent was prepared by dissolving $P_2O_5.2OMoO_5.51H_2O$ (10 g.) in water (100 ml.) to which had been added concentrated nitric acid (1 ml.) A drop of this reagent was then mixed with a drop of the narcotic solution for each concentration. An instantaneous reaction, except at the limiting narcotic concentration, occurred producing an amorphous precipitate. This concentration varied with the type of narcotic, and the amount of precipitate varied directly with the concentration of the narcotic. The slides were observed and the one showing the least amount of the precipitate was selected and the bottle from which the solution came was labelled "solution 1". The bottles on the left and the right of solution 1 were then labelled 32, 16, 8, 4, 2, (1), 1/2, 1/4, 1/8, 1/16, 1/32. These numbers are referred to as solution numbers and are indicative of the general alkaloidal precipitation power of phosphomolybdic acid. Table II lists the concentration corresponding to solution 1 for the narcotic solutions.

Table II

SENSITIVITY OF NARCOTIC SOLUTIONS TO PRECIPITATION BY PHOSPHOMOLYBDIC ACID

Name of narcotic free-base	*Chemical class of narcotic*	*Concentration of narcotic corresponding to solution 1 in per cent*
Methadone	Diarylalkanoneamines	0.03
Pipidone		0.03
Phenadoxone		0.03
Pethidine	Arylpiperidines	0.03
Hydroxypethidine		0.08
Alphaprodine		0.13
Ketobemidone		0.02
Methorphinan	Hydrophenanthrenes	0.01

Table III

CRITERIA FOR BEST CRYSTAL TESTS

Products	(1) Highly characteristic crystal *habit*[a]	*Reactants (B)*	(7) The reagent should be permanent
	(2) Easily recognizable geometrical *form*[a]		(8) The reagent should be general alkaloidal precipitant (provided that the crystal habits are easily distinguished from others given by the same reagent) or a reagent which does not precipitate at all with most other alkaloids or amines
	(3) Crystals should develop readily (within 15 minutes)		
	(4) Crystallization over a wide range of narcotic concentrations		
Reactants (A)	(5) Crystals should have same geometric form over a wide concentration range		
	(6) The reagent should be sensitive		

[a] See definition in text.

Criterion (8) in table III states that a reagent should be general. In order to illustrate the generality of the reagents mentioned earlier, a brief review of the reactions with other narcotics was made. The results of this work are shown in table IV.

Table IV

OTHER AMINES YIELDING CRYSTALLINE PRODUCTS WITH REAGENTS RECOMMENDED FOR SYNTHETIC NARCOTICS

Chemical class of reagent	*Narcotic yielding characteristic crystals*	*Alkaloid or narcotic previously found to yield crystalline precipitates*
Basic reagents		
1. Sodium phosphate Na_3PO_4	Metopon	Heroin, narcotine, papaverine, strychnine, cinchonidine[38]
2. Disodium methyl-arsonate $Na_2CH_3AsO_3 5H_2O$	Metopon	Dicodid, dilaudid, eucodal, methadone[6]
3. Ammonium carbonate $(NH_4)_2CO_3$	Metopon	Methadone,[42] dicodide, dilaudid, eucodal[6]
4. Ammonium hydroxide NH_4OH	Metopon	Methadone,[42] thebaine, cinchonine,[38] morphine, dicodide, eucodal,[6] thebaine, brucine, cinchonidine[17]
Complex oxygen acids		
5. Phosphomolybdic acid $P_2O_5.20MoO_3.51H_2O$	Amorphous precipitates with all synthetic narcotics	General alkaloidal-precipitant, used for determination of relative sensitivities of other alkaloidal reagents, i.e., determination of solution number[13, 14, 15]
Halogen reagents		
6. Iodine in hydrobromic acid, I_2+HBr	Methadone	Methadone[18]
Simple alkalihalides		
7. Potassium iodide, KI	Pethidine	Apomorphine, codeine, morphine, narceine, dilaudid, brucine, strychnine, dicodid, eucodal[38]
Double or complex salts or acids of central metals		
(a) *Chlorides and chloroacids*		
8. Chlorauric acid $HAuCl_4$	Metopon	Cocaine,[16] apomorphine, benzoylecgonine, heroin, narceine, thebaine, strychnine, caffeine, theobromine, eucodal, benzedrine, homatropine,[34, 35, 38]
9. Chlorauric acid in acetic acid	Pipidone	Cocaine[16]
10. Chloroplatinic acid H_2PtCl_6	Pethidine, ketobemidone	Apomorphine, benzoylecgonine, cocaine, heroin, narceine, thebaine, α-eucaine,[17] brucine, cinchonidine, cotarnine[38]
11. Chromium sulfate chloride $CrSO_4Cl$	Methadone	Strychnine[18]
(b) *Bromides and bromauric acids*		
12. Bromauric acid $HAuBr_4$	Pethidine	Methadone, cocaine, ecgonine, α-eucaine, hyoscine[38, 17]
13. Bromauric acid in hydrochloric acid $(HAuBr_4+HCl)$	Pethidine	Heroin, morphine, hyoscine, hyoscamine[17, 4]
14. Mercuric bromide in hydrochloric acid $(HgBr_2+HCl)$	Methadone	Brucine[17]
(c) *Iodides*		
15. Sodium silver iodide	Alphaprodine	Cocaine
16. Potassium lead iodide	Alphaprodine, hydroxypethidine	Codeine, arecoline, cocaine[30]
17. Sodium lead iodide	Alphaprodine, hydroxypethidine	Codeine, procaine
18. Potassium thorium iodide	Methadone	None

Chemical class of reagent	*Narcotic yielding characteristic crystals*	*Alkaloid or narcotic previously found to yield crystalline precipitates*
(d) *Thiocyanates*		
19. Reinecke's salt, ammonium-diammine-chromium-tetrathiocyanate $NH_4(NH_3)_2Cr(SCN)_4$	Hydroxypethidine, methorphinan, ketobemidone	Narcotine, cocaine, papaverine, codeine, cinchonine, nicotine, brucine, stovaine, ephedrine, betaine, carnitine, choline, morphine [34, 26]
20. Sodium mercuric nitrite $Na_2Hg(NO_2)_4$	Ketobemidone	[13]
21. Picric acid, 2,4,6,-$(NO_2)_3C_6H_2OH)$	Phenadoxone, alphaprodine	Berberine, brucine, cinchonine, cotarnine, heroin, strychnine, cocaine, cinchonidine[38]
22. Picrolonic acid $NO_2C_6H_4NN:C(CH_3)C(NO_2):COH$	Metopon	Codein, morphine, eucodal[6]

B. Results of tests

The following descriptions of the characteristic crystal reactions are given to illustrate the results obtained with the various reagents. The narcotics are grouped according to the chemical family to which they belong. It must be remembered that in actual identification one should not rely on a word description of the product, but should make comparison with a sample of the known narcotic in all cases. A summary of sensitivities of the reagents is given in table V.

Descriptions of crystal tests

Diarylalkoneamines

(1) *Methadone with chromium sulfate chloride:* the precipitating reagent is apparently $CrSO_4Cl$ with an unknown proportion of acid associated with the molecule. Applied to the methadone or amidone solution it soon yields rather large, pale, yellow, feathered plates very characteristic especially in solutions 16 to 1 (see table V). In more dilute solutions they form gradually down to solution 1/8 (1:25,600). The reagent does not appear to be general. Strychnine also gives some light yellow plates, but not similar to those of amidone. We have been able to prepare the reagent using chemicals obtained from one of the inventors (Fulton). However, the reagent could not be prepared using chromic sulfate and chloride obtained from two other sources. The reagent should be prepared by other workers and subjected to further field testing. Fulton's article should be consulted.[18]

(2) *Methadone with iodine in hydrobromic acid:* the precipitate after crystallization is often trimorphous and tricolour. The most easily obtained crystals are the feathered elongate plates in groups, white (entirely colourless) and transparent. Crystals occur in all solutions from 64 to 1/8 by allowing the test drop to stand. There are two other characteristic forms, these are red grains and pale yellow square-cut plates. The red grains and white plates in the same field present a unique and unmistakable appearance. They are obtained together in solutions 32 to 1/8 (1:200 to 1:25,600). This is the best test for amidone, Fulton.[18] Pictures of the three types of characteristic crystals were given by Farmilo et. al.[10]

(3) *Methadone with platinum cyanide:* rosettes of curving hairs or fine threads. Easily obtained down to solution 1/8, slowly even in solution 1/16, Fulton.[18]

(4) *Methadone with mercuric bromide in hydrochloric acid:* the crystals are colourless white feathered plates and splinter crystals often in groups. They are usually the same in all solutions. The plates are the characteristic habit. An illustration of the characteristic habit was given by Farmilo et. al.[10] The test was described by Fulton.[18]

(5) *Methadone with thorium nitrate potassium-iodide:* this is an entirely new reagent invented for methadone in our laboratory. Amidone with KI alone forms a characteristic "book-like" crystal habit. The plates are rectangular and attached to a central line. This is entirely different from the habit for potassium thorium iodide reagent. The fine double-pointed thin rods are joined in pairs at their centre in the test solutions. This is the characteristic crystal habit with potassium thorium iodide and cannot be confused with the crystals obtained with potassium iodide alone. Solutions 8 to 1 yield the characteristic crystal habits with potassium thorium iodide.

(6) *Pipidone with chlorauric acid in acetic acid:* the precipitate is a characteristic massive crystal growth made up of blade-like forms growing in clusters. The clusters gather in groups and are weed-like in general appearance. The crystal habit is very characteristic and forms readily in all solutions from 2 to 1/2. The reagent is sensitive. The test fulfils all the criteria in table III.

(7) *Phenadoxone with picric acid:* the characteristic crystal habit formed by this microchemical reaction between phenadoxone and picric acid is a mass of fragile, irregular, corrugated, wafer-like transparent plates. The plates overlie one another and the upper layers are shaded by the lower plates, which cast sharply defined, triangular shadows which give the field a very striking characteristic appearance. The crystal habit was obtained from solutions 4 and 1 (1:800 to 1:3,200). The reagent is only medium sensitive.

Arylpiperidines

(8) *Pethidine with bromauric acid and with bromauric acid in hydrochloric acid:* these reagents were designed for application to the dry narcotic. Direct application to a few grains of the pethidine hydrochloride powder yields the highly characteristic crystal habits. The crystal forms are transparent rectangles

and plates with tooth-like indentations in the narrow end. The forms are grouped together and grow out of the regions of narcotic grains which may remain undissolved. The bromauric acid reagents are very sensitive and have been used[17] to give characteristic crystals with cocaine, ecgonine, eucaine, heroin, morphine, as well as with non-narcotics hyoscine and hyoscyamine and nicotine. The reagent prepared with hydrochloric acid is most sensitive for direct application.[19]

(9) *Hydroxypethidine with potassium lead iodide:* the precipitate formed in the reaction between hydroxypethidine (bemidone) and potassium lead iodide is a characteristic crystal habit made up of long, fine rods, criss-crossed throughout the solution. The reagent was first used by Martini for the identification of cocaine.[20] Solutions of bemidone containing 0.13 to 0.03 per cent produce the same crystal form. The reagent in the present formula is medium to sensitive, on the sensitivity scale (table VI).

(10) *Hydroxypethidine with Reinecke's salt:* the characteristic crystal habit formed in the identification reaction between bemidone and Reinecke's salt is dimorphous. The forms are needles and plates. The needles are found in sheaf-like masses and two or more sheaves may be found joined together; the plates have irregular curved edges and are transparent and may be grouped in the outline of a rosette. The sheaves of needles grow most frequently on the edge of the drop. Crystals are obtained from solutions 4 to 1/2 using a freshly prepared saturated solution of ammonium reineckate. The reagent is not very stable in aqueous solution and only a small amount of solution should be prepared at the time of testing. The reagent is extremely general and gives precipitates with most amines.[26]

(11) *Hydroxypethidine with sodium lead iodide:* clusters of rectangular transparent short plates make up the characteristic crystal habit formed in this reaction. The reagent is only medium-sensitive, crystalline precipitates being obtained with solution 8 and 4.

(12) *Alphaprodine with sodium lead iodide:* the characteristic crystal habit formed in the reaction of nisentil with sodium lead iodide is dimorphous. The two forms present are spheroids and clusters of transparent plates. The plates grow out of the mass of spheres. The spheres appear to be clusters of very minute needles. The crystal habit is formed in solutions 1 or higher. The solution concentration is 1:800 and hence the reagent is of low sensitivity.

(13) *Alphaprodine with picric acid (aqueous):* the characteristic crystal habit is a thread-like mass of crystals in no definite pattern. The threads may be joined together in a tree-like structure. A second coarser type of crystal is found. These are in dense rosettes which grow from the amorphous precipitate. The test has only low sensitivity and is given by solutions 1 to 4 (1:200 — 1:800). The reagent has been applied very widely in alkaloidal identification and characterization (see under discussion).

(14) *Alphaprodine with sodium silver iodide:* a highly characteristic crystal habit and easily formed crystalline product is obtained with nisentil and sodium silver iodide. The crystals are in the forms of rectangular blocks in clusters and spear-shaped plates in groups of four. The latter have a butterfly-like appearance. The reagent is sensitive and yields crystals with solutions 1 and 2.

(15) *Alphaprodine with potassium lead iodide:* the results of sodium lead iodide and potassium lead iodide reagents with nisentil are related. The crystals formed with potassium lead iodide are long, narrow, rectangular, thin plates which gather in tufts, or are scattered in finer groups in solution 1 (1:800). There are also some of the tufts which viewed from the end appear to be heavy balls made up of thin plates. The reagent produces crystals down to solution 1/4 and is therefore quite sensitive to alphaprodine. The habit is quite characteristic. The reagent gives crystals with cocaine and hydroxypethidine, which are closely related to alphaprodine in structure as well as having about the same basic strength. The crystal habits of these three narcotics with potassium lead iodide are sufficiently different for purposes of identification.

(16) *Ketobemidone with sodium mercuric nitrite:* the precipitate is made up of highly characteristic four-pointed stars which have an internal structure and are extremely fine grained. The reagent has medium sensitivity. The best crystal habit was obtained from solution 16 (1:400).

(17) *Ketobemidone with Reinecke's salt:* the crystal forms are transparent plates with round ends arranged as rosettes. The crystal habit changes somewhat on standing and the plates may show dendritic growths along their sides; the rosettes are somewhat simpler in these cases. The characteristic habit is obtained in concentrations from 0.5 to 0.06 per cent. The reagent is only moderately sensitive and must be used as a freshly prepared solution.

(18) *Ketobemidone with chloroplatinic acid:* this reagent is used in direct application to the powdered narcotic. A few grains of ketobemidone are sufficient to perform the identification. The crystals may be quadrilateral plates or parallelograms and the habit is characteristically clusters of groups of two or three floating in the drop. When viewed on end the plates may appear to be fine rods. The reagent is generally applicable and sensitive. The test fulfils all the criteria in table III.

Hydrophenanthrenes

(19) *Methorphinan with Reinecke's salt:* Methorphinan has been recently introduced into Canada as a narcotic. It is quite strongly basic and has a high sensitivity to phosphomolybdic acid. It can be readily identified as the reineckate. Solution 1 is 1:25,600. The

characteristic crystals produced by dromoran and ammonium reineckate are rosettes of elliptical, transparent, fine plates. These occur almost specifically in solution 8 (1:600) and down to solution 4 (1:3,200). In more dilute solutions the plates become elongated and connected in thread-like masses. The test is very good and the only microcrystal test developed so far for the identification of methorphinan.*

(20) *Metopon with disodium methylarsonate:* the characteristic crystals produced in the reaction of disodium methylarsonate (arrhenal) and metopon are clusters of very dense short rods (rhombohedrons). The forms are easily recognized and specific. The test is not very sensitive since it is not given below a concentration of 1:200. Other ketones of the hydrophenanthrene series of narcotic bases such as dicodide, dilaudide, eucodal give somewhat similar reactions. The test is probably most useful in a diagnostic sense; it is definitely not the best crystal test.

(21) *Metopon with picrolonic acid:* the crystals from the reaction between metopon and picrolonic acid are pointed blades which soon show secondary growths at the interfacial angles. The characteristic crystal habits in dilute solutions (less than 0.5 per cent) are clusters of saw-like pointed blades. The reagent is the best one for metopon.

Table V shows the reagents considered most characteristic for these narcotics. The sensitivity is stated in terms of solution number (i.e., in comparison to phosphomolybdic acid), and the range of concentration for optimum crystallization is also stated, in terms of per cent. The order of sensitivity of the reagents is also described in words in table V, e.g., medium sensitive (Med. sens.), which brackets the precipitating power in relation to phosphomolybdic acid which is a sensitive reagent. The full scale of sensitivities is described in table VI.

* Another test for methorphinan has recently come to our attention. The reagent platinic chloride in 1N HCl is prepared as follows: 5 ml., 0.5 per cent platinic chloride in 1N HCl diluted with 45 ml. 90.1 per cent KI solution and subsequently diluted to 100 ml. with H_2O. The characteristic precipitate is formed with the dry powdered narcotic, rosettes and needles. [The formula of this reagent was supplied by Dr. C. J. Umberger, Bellevue Hospital, N.Y. City]

Table V

MICROCHEMICAL REAGENTS FOR SYNTHETIC NARCOTIC IDENTIFICATION

		SOLUTION SENSITIVITY		
	Reagent name	*Limit of precipitation*	*Rrange of concentration for optimum crystallization*	*Order of sensitivity*
1. Amidone	Chromium sulfate chloride	1/8	0.50-0.030 1:200-1:3,200	Med. sens.
	Iodine in hydrobromic acid	1/16	0.13-0.003 1:850-1:25,600	Med. high
	Platinum cyanide	1/8	0.03-0.003 1:3,200-1:25,600	Sens. high
	Mercuric bromide and hydrochloric acid	1/16	0.06-0.030 1:1,600-1:3,200	Med. sens.
	Potassium thorium iodide	8	0.50-0.030 1:200-1:3,200	Low sens.
2. Pipidone	Chlorauric acid in acetic acid	1	0.06-0.015 1:1,600-1:6,400	Med. sens.
3. Phenadoxone	Picric acid (alcoholic)	2(1)	0.13-0.03 1:800-1:3,200	Med. sens.
4. Pethidine	Bromauric acid	On solid	On solid	
	Bromauric acid in hydrochloric acid	On solid	On solid	
5. Hydroxypethidine	Potassium lead acetate	4	1.13-0.03 1:800-1:3,200	Med. sens.
	Reinecke's salt	4	0.13-0.06 1:800-1:6,400	Med. sens.
	Sodium lead iodide	4	0.25-0.13 1:400-1:800	Med. med.
6. Ketobemidone	Sodium mercuric nitrite	32	0.50-0.13 1:200-1:800	Low med.
	Reinecke's salt	8	0.5-0.06 1:200-1:6,400	Low sens.
	Chlorplatinic acid	On solid	On solid	
7. Alphaprodine	Sodium lead iodide	1/2	Solution (2) 1:600	Med.
	Picric acid (aqueous)	1/2	0.5-0.25 1:200-1:400	Low low
	Sodium silver iodide	1	0.25-0.13 1:200-1:800	Low med.
	Potassium lead iodide	1/2	0.13-0.06 1:800-1:600	Med. med.
8. Methorphinan	Reinecke's salt	2(1/8)	0.13-0.02 1:800-1:5,000	Med. sens.
9. Metopon	Disodium methyl arsonate		1.0-0.5 1:100-1:200	Low low
	Picrolonic acid		1.0-0.5 1:100-1:200	Low low

C. Discussion

At present most narcotic identification is based on derivative formation of a special kind. Precipitates are obtained which have reproducible and readily recognizable crystal habits; characteristic of the particular narcotic. Experience has shown[25] that when the product resulting from the reaction of narcotic and reagent is distinctive and readily formed the microscopic method leaves little to be desired.[14] Usually, in fact, mere inspection under the ordinary microscope is quite satisfactory — when the crystals are truly characteristic — but the polarizing microscope is often useful, and data of optical crystallography can be used, not only on crystalline derivatives, but also on the original salt.[22, 24, 25, 44] X-ray diffraction is also a powerful means of identifying crystalline material, and is coming into use more and more.[20, 22]

One of the difficulties of the narcotic analyst is to choose between the large number of precipitating reagents available to him. To facilitate a systematic survey of the many reagents, listed in the literature [1, 2, 4, 8, 12, 15, 34, 38, 43] it was convenient to organize them according to their obvious chemical properties. This logical method helped to avoid duplication, evident in empirical formulae listed under a variety of inventors' names, and enabled choice of the most sensitive reagent formula to be made. Fulton[13, 19] has made the most detailed study of this problem of multiplicity of reagents. Whitmore and Wood[43] have used his classification in their study of toxicologically important alkaloids. Fulton's classification of reagents into certain chemical groups is used in most of the following tables.

In our view, while the subdivided groups are extremely useful, the reagents may be classified primarily into two major chemical groups: basic, and acidic or metathetic. The basic reagents liberate the organic free-base, and the acidic reagents undergo a metathetical reaction with the amine or salt to produce a new molecule. In the present study it was found, with the exception of metopon, that most of the synthetic narcotics of the diarylpiperidine, alkanoneamine and hydrophenanthrene groups undergo the metathetical type of reaction. However, as table IV shows, the basic reagents are quite useful for identification and give characteristic crystals with eighteen other amines. Perhaps the most widely applied reagents are the complexes of gold and platinum such as chlorauric, chloroplatinic and bromauric acids. These reagents have been used not only in chemical characterizations familiar to classical organic chemists, but primarily by drug analysts. Picric acid is one of the popular organic reagents and is almost equal to chloroplatinic acid in its ability to produce crystalline precipitates. Of forty-one opium alkaloids and derivatives described by Small and Lutz,[35] eighteen are recorded as giving crystalline precipitates with chloroplatinic acid, nine with chlorauric acid, and fourteen with picric acid. In Stephenson's studies on fifty-four alkaloids, twenty-two crystalline precipitates were obtained with chlorauric acid, nineteen with chloroplatinic acid and thirteen with picric acid.[38] The best other reagents in Stephenson's studies were Kraut's (potassium bismuth iodide), Wagner's (iodine in potassium iodide), mercuric chloride (yields many crystals, but they are usually not as characteristic as those with gold and platinum chlorides), potassium iodide, Marme's (potassium cadmium iodide), Mayer's (potassium mercuric iodide), palladous chloride, and basic reagents of three widely different strengths, potassium hydroxide, sodium carbonate and potassium chromate.

The most general reagent for characterization that we have discovered for synthetic narcotics is ammonium-diammine-chromium-tetrathiocyanate or Reinecke's salt, which yielded crystalline precipitates with methadone, pipidone, phenadoxone, pethidine, alphaprodine, ketobemidone, methylmorphinan and metopon.

These precipitates were crystalline, when prepared under the proper conditions, and they may be used for chemical characterization. Three of the reineckates are included in table V, and a further and more detailed report on the results with this reagent will be made elsewhere.[26]

D. Tabulation of previous work on identification of methadone and pethidine

Table VI illustrates four different methods used by workers to express the concentrations of the narcotic or reactant A (see table III) of a microchemical reaction for identification of amidone. The concentration range of narcotic solutions has been divided into four regions of sensitivity. The best crystal tests are those given with reagents below solution 1 (least concentration which gives precipitates with phosphomolybdic acid). Solution I is identical in concentration for pethidine and amidone. The initials in the body of table VI indicate the concentrations studied by the various workers in this field.

Tables VII and VIII summarize the names and show the chemical classes of the reagents which give crystals with amidone and pethidine hydrochlorides. Tables VII and VIII also show how well the reagents fit the requirements of a best crystal test given in table III, numbers 4, 5 and 6.

Table IX shows the most promising microchemical reactions which have been recommended to date by various authors for the detection of amidone and pethidine. These reagents were selected as the most promising by the various workers shown in the column entitled "References". The authors, except in two cases, did not indicate what criteria were used in selecting the recommended tests. Fulton[18] listed eight criteria which are essentially the same as those given above, table III, Watson and Bowman[42] used four criteria, of which two were negative ones, i.e., were used for discarding all but three of forty-three crystals that they found as tests for amidone. It may be pointed

our that at least fifteen of Watson and Bowman's tests are basic reagents and would give the free-base amidone which crystallizes readily from basic solutions.

Tables IX and X summarize the "best" crystal tests for amidone and pethidine as recommended by analytical chemists for the detection of narcotics. Table X shows the tests listed in order of their decrease in sensitivity (criterion (6), table III). Illustrations of the crystals obtained with these reagents can be found in the original papers.

Table VI

COMPARISON OF CONCENTRATIONS USED BY VARIOUS AUTHORS IN STUDY OF MICROCHEMICAL REACTIONS OF AMIDONE AND PETHIDINE

SENSITIVITY SCALE				REFERENCES																				
				Amidone HCl										Pethidine HCl										
	Micrograms per cent	Solution parts	Concentration per cent conc.	Solution no.									Solution no.											
Low	—	1:50	2.0	64	F	W and B	H and J	—	B and F	L and F	—	—	64	B and F	L and F	D	—	H	—	W				
	—	1:100	1.0	32	F	—	—	S	B and F	L and F	—	—	32	B and F	L and F		L		—					
	—	1:200	0.5	16	F	W and B	H and J	—	B and F	L and F	—	—	16	B and F	L and F		—		—					
	—	1:300	0.33		—	—	—	—	—	—	—	—	—	—	—		—		—					
	—	1:400	0.25	8	F	—	—	—	B and F	L and F	—	—	8	B and F	L and F		—		—					
Med.	—	1:500	0.20		—	—	H and J	—	—	—	—	—	—	—	—		L		—					
	—	1:600	0.165		—	—	—	—	—	—	—	—	—	—	—		—		—					
	—	1:700	0.143		—	—	—	—	—	—	—	—	—	—	—		—		—					
	—	1:800	0.125	4	F	—	—	—	—	L and F	—	—	4	—	L and F		—		—					
	—	1:900	**0.111**		—	—	—	—	—	—	—	—	—	—	—		—		—					
	1000	1:1,000	0.100		—	W and B	H and J	S	B and F	—	—	Lu	—	B and F	—	Data not available	—	None given	—	None given				
	—	1:1,600	0.0625	2	F	—	—	—	—	L and F	—	—	2	—	—		L		—					
Sens.	—	1:2,000	0.05		—	—	—	—	B and F	—	—	—	—	B and F	—		—		—					
	—	1:3,200	0.03125	1	F	—	—	—	—	L and F	—	—	1	—	L and F		—		—					
	—	1:4,000	0.025		—	—	—	—	—	—	—	—	—	—	—		—		—					
	—	1:5,000	0.02		—	—	H and J	—	—	—	—	—	—	—	—		—		—					
	—	1:6,400	0.015625	1/2	F	—	—	—	—	L and F	—	—	1/2	—	L and F		—		—					
	100	1:10,000	0.01		—	—	H and J	—	B and F	—	—	V	—	—	B and F		—		—					
High	—	1:12,800	0.007125	1/4	F	—	—	—	—	L and F	—	—	1/4	—	L and F		—		—					
	50	1:20,000	0.005		—	—	—	—	—	—	—	—	—	—	—		—		—					
	—	1:25,600	0.00356	1/8	F	—	—	—	—	L and F	—	—	1/8	—	L and F		—		—					
	20	1:50,000	0.00200		—	—	—	—	—	—	—	—	—	—	—		—		—					
	—	1:51,200	0.00128	1/16	F	—	—	—	—	L and F	—	—	1/16	—	L and F		—		—					

Key to references

F — Fulton[18]
W and B — Watson and Bowman[42]
H and J — Hubach and Jones[22]
S — Schuldiner[37]
B and F — Berry and Farmilo[10]
L and F — Levi and Farmilo
D — Ducloux[8]
L — Levine[27]
Lu — Lucas[28]
V — Vidic[39]
K — Keenan[24]
H — Hanson[21]
W — Wickstrøm[44]

Table VII

MICROCHEMICAL REAGENTS WHICH GIVE CRYSTALS WITH AMIDONE HYDROCHLORIDE

Group		Chemical classification of reagents	Limits of immediate precipitation and of crystallization			Reference (see table VI)
			Solution no.	Per cent	Parts	
A	I.	*Basic reagents*				
		Potassium acetate	16	0.500	1:200	F, W and B
		Potassium hydroxide	1/2	0.016	1:6,400	F, W and B
		Sodium carbonate	1/2	0.016	1:6,400	F, W and B
		Sodium phosphate (Na_2HPO_4)	4	0.125	1:800	F, W and B
B		*Oxygen acids*				
	II.	*Simple oxygen acids*				
		Chlorochromic acid	1	0.030	1:3,200	
			(1/16)	0.0013	1:51,200	F
	III.	*Complex oxygen acids*				
		(None used for crystals)				
C	IV.	*Halogen reagents*				
		Bromine water	1/8	0.0036	1:25,600	F, W and B
		Iodine in 10 per cent hydrochloric acid	1/16	0.001	1:25,600	
			(1/8)	0.0036	1:51,200	F
		Iodine in sodium bromide	1/16	0.001	1:51,200	
			(1/4)	1.007	1:12,800	F
		Iodine in potassium iodide (1:1)	1/8	0.0036	1:25,600	F, S
		Iodine in potassium iodide (1:133)	(1/16)	0.0036	1:25,600	
				0.001	1:56,000	F
		Bromine in potassium bromide		No definite conc. given		S
		Iodine zinc chloride	4	0.1	1:1,000	S
D	V.	*Simple alkali halides and pseudohalides*				
		Potassium iodide (1:2)	16	0.5	1:200	
			(1)	0.03	1:3,200	F, H and J

Group		Chemical classification of reagents	Limits of immediate precipitation and of crystallization: Solution no.	Per cent	Parts	Reference (see table VI)
E		*Double or complex salts and acids of central metals*				
	VI.	*Chlorides*				
		Chlorpalladous acid	2	0.6	1:1,600	
			(1/4)	0.007	1:12,800	F, W and B
		Chlorpalladous and hydrochloric acids	8	0.25	1:400	
			(1)	0.0313	1:3,200	F
		Chlorplatinic acid	4	0.125	1:800	
			(1/4)	0.007	1:12,800	F
		Chlorplatinic and hydrochloric acids	8	0.25	1:400	
			(1/2)	1.016	1:6,400	F
		Ferric chloride and concentrated hydrochloric	4	0.25	1:800	
			(1/16)	0.013	1:51,200	F
		Stannic chloride and hydrochloric acid	8	0.25	1:400	F
		Chromium sulfate chloride	16	0.5	1:200	
			(1/8)	0.0036	1:25,600	F
		Uranylchloride in concentrated hydrochloric	32	1.0	1:100	
			(2)	0.063	1:1,600	F
	VII.	*Bromides*				
		Bromopalladous and hydrochloric acids	1/4	0.007	1:6,400	
			(1/2)	0.0157	1:12,800	F
		Bromoplatinic acid	1	0.0313	1:3,200	
		Bromoplatinic and hydrobromic acids	2	0.063	1:1,600	
			(1)	0.031	1:3,200	F
		Bromopentachlorplatinic and hydrochloric acids	4	0.25	1:800	
			(2)	0.0625	1:1,600	F
		Stannic hydrobromic acid	2	0.06	1:600	
			(1)	0.0313	1:3,200	F
		Zinc hydrobromic acid	8	0.25	1:400	
			(2)	0.0625	1:600	F
	VIII.	*Iodides*				
		Mercuric iodide in potassium iodide (1.1)	1/2	0.0156	1:6,400	
			(1/16)	0.0013	1:57,200	F, H and J
		Goldchloride in hydrogeniodide	1/2	0.0062	1:1,600	L
			4	0.1	1:1,000	S
		Cadmium iodide	None given			
	IX.	*Cyanides*				
		Platinum cyanide	1	0.3125	1:25,600	
			(1/8)	0.0035	1:3,200	F
		Gold cyanide	1	0.312	1:3,200	
			(1/8)	0.00356	1:25,600	F
		Potassium ferricyanide	32	1.0	1:100	
				0.20	1:500	F, H and J
		Potassium ferrocyanide	16	0.20	1:500	H and J, W and B
	X.	*Thiocyanates*				
		Cobalt thiocyanate		0.1	1:1,000	S
		(yields non-crystalline blue precipitate)				
	XI.	*Nitrites (Nitrates)*				
		Mercuric sodium chloronitrite	(4)	0.125	1:800	F
		Lanthanum and uranium nitrates	—	5.0	1:20	H and J
	XII.	*Double halides and pseudohalides*				
		Mercuric iodide in hydrochloric acid	1/2	0.0156	1:6,400	F
		Mercuric cyanide and sodium iodide	1/4	0.007	1:12,800	F
			(1/8)	0.0036	1:25,600	F
		Mercuric sodium bromide	1/8	0.0036	1:25,600	
		Mercuric sodium chloride	1	0.03	1:3,200	
			(1/16)	0.0013	1:51,200	F
		Chloromercuric acid	1	0.03	1:3,200	
			(1/16)	0.0013	1:51,200	F
		Mercuric chloride with hydrochloric	2	1.06	1:1,600	
			(1/4)	0.007	1:12,800	F, V
		Mercuric bromide with hydrochloric acid	1	0.03	1:3,200	
			(1/16)	0.013	1:51,200	
		Mercuric chloride (5 per cent)	1	0.025	1:400	L
		Mercuric bromide	None given			S
F	XIII.	*Organic reagents*				
		Picric acid	1/2	0.015	1:6,400	
			1/4	0.007	1:12,800	B and F, V.
		Saccharin	None given			W and B

The solution number is given in parentheses where it stands for the limit of crystallization, i.e., the limit for a reliable crystal test.

Table VIII

MICROCHEMICAL REAGENTS WHICH GIVE CRYSTALS WITH PETHIDINE HYDROCHLORIDE

Group		Chemical classification of reagents	Sensitivity values: Solution no.	Per cent	Parts	Reference (see table VI)
A	I.	*Basic reagents*				
		None give crystals				
B		*Oxygen acids*				
	II.	*Simple oxygen acids*				
		Perchloric acid				D
		Potassium dichromate in hydrochloric	8	0.2(?)	1:500–?	L
		Potassium chromate in hydrochloric	8	0.2(?)	1:500–?	L
		Chromic anhydride in hydrochloric	8	0.2(?)	1:500–?	L
		Nitric acid	—	5–10	1:200–1/10	W
	III.	*Complex oxygen acids*				
		(None used for crystals with pethidine)				
C	IV.	*Halogen reagents*				
		Hydrobromic acid		None given		D
		Iodine in potassium iodide (1:1)				D
D	V.	*Simple alkali halides and pseudohalides*				
		Potassium iodide (5 per cent)	1	0.2	1:2,000	L, K
			8	0.5		
E		*Halide and pseudohalide salts and acids of central metals*				
	VI.	*Chlorides*				
		Platinic chloride	8	0.2(?)	1:500(?)	L, D
		Mercuric chloride	8	0.2(?)	1:500(?)	L, D
		Palladium chloride	8	0.2(?)	1:500(?)	L
		Cobaltic chloride				D
		Chlorauric acid in conc. HCl.				
		Chlorauric acid in phosphoric and acetic acids (2:1)				
		Chlorauric acid in (1÷1)		On solid only		F
	VII.	*Bromides*				
		Sulfuric acid				
		Bromoplatinic acid in (2÷3) sulfuric				
	VIII.	*Iodides*				
		Bismuth potassium iodide, acid		2.0(?)		D
	IX.	*Cyanides*				
		Potassium ferricyanide				F, B and F, D
		Potassium ferricyanide	64	2.0(?)		L
				None given		
		Sodium nitroferricyanide	8	0.2	1:400	L, K
			32	1.0	1:400	
			16	0.4	1:300	D, B and F, L and F
	X.	*Thiocyanates*				
		Reinecke's salt	1	0.03	1:3,200	
	XI.	*Nitrites (Nitrates)*				
	XII.	*Double halides and pseudohalides*				
		(None used for crystals with pethidine)				
F	XIII.	*Organic reagents*				
		Picric acid	4	0.1	1:100	H, L, V, K
			1/2	0.02	1:500	
		Picrolonic acid	1/2	0.02	1:5,000	H, V, K
		Styphnic acid	1/2	0.02	1:5,000	

Table IX

MICROCHEMICAL REAGENTS RECOMMENDED BY VARIOUS AUTHORS FOR DETECTION OF AMIDONE AND PETHIDINE HYDROCHLORIDES

	Chemical class (References 13, 14 and 15)		*Crystallization range for test or lowest concentration*	*Reference*	
				Author	*No.*
Amidone hydrochloride:					
Reagent name					
Chromium sulfate chloride	E	VI	1:200 – 1:25,600	Fulton	18
Iodine in 10 per cent hydrobromic acid	C	IV	1:100 – 1:25,600	Fulton	18
Platinum cyanide	E	IX	1:100 – 1:25,600	Fulton	18
Mercuric bromide with HCl	E	XII	1:100 – 1:51,200	Fulton	18
Iodine zinc chloride	C	IV	1:1,000	Schuldiner	37
				Fulton	18
Iodine potassium iodide (1:1)	C	IV	None given	Schuldiner	37
Potassium bromobromide (1:1)	C	IV	None given	Schuldiner	37
Mercuric bromide	E	XII	None given	Schuldiner	37
Cadmium iodide in KI (1:2)	E	VIII	None given	Schuldiner	37
	E	VIII	None given	Schuldiner	37
Palladium chloride	E	VI	1:400 – 1:3,200	Fulton	18
				Watson and Bowman	42
				Hubach and Jones	22
Potassium ferrocyanide	E	IX	1:50	Watson and Bowman	42
Bromine water	C	IV	1:200 – 1:1,000	Watson and Bowman	42
Chlorauric acid in HI (1:0.5)	E	VIII	1:16,000	Lucas	28
Mercuric chloride (5 per cent)	E	XII	1:4,000	Lucas	28
Mercuric bromide	E	XII	None given	Lucas	29
Potassium iodide (5 per cent)	D	V	1:1,000	Hubach and Jones	22
Potassium ferrocyanide (5 per cent)	E	IX	1:500	Hubach and Jones	22
Cadmium iodide in potassium iodide (1:2)	E	VIII	1:10,000	Hubach and Jones	22
Mercuric iodide in potassium iodide (1:2)	E	VIII	1:20,000	Hubach and Jones	22
Iodine in potassium iodide (1:1)	C	IV	1:1,000	Hubach and Jones	22
Lanthanum nitrate, 20 per cent	E	XI	1:20	Hubach and Jones	22
Uranium nitrate, 20 per cent	E	XI	None given	Hubach and Jones	22
Mercuric chloride in HCl(dil)	E	XII	1:50,000	Vidic	39
Pethidine hydrochloride:					
Reagent name					
Picric acid (aq.)	F	XIII	1:1,000 or less	Levine	27
Potassium iodide (20 per cent)	D	V	1:500 – 1:2,000 or less	Levine	27
Sodium nitroferricyanide	E	IX	1:100 – 1:500	Levine	27
Lead iodide in NaOAc	B	II	1:1,000 or less	Levine	27
Potassium dichromate			1:500 or less	Levine	27
Picric acid (aq.)	F	XIII	None given	Hanson	21
Picrolonic acid (aq.)	F	XIII	None given	Hanson	21
Bismuth potassium iodide	E	VIII	None given	Ducloux	8
Iodine in potassium iodide (1:1)	C	IV	None given	Ducloux	8
Chloroplatinic acid	E	VI	None given	Ducloux	8
Picrolonic acid	E	VIII	None given	Ducloux	8
Perchloric acid	B	II	None given	Ducloux	8
Mercuric chloride	F	VI(c)	None given	Ducloux	8
Cobaltic chloride	E	VI(c)	None given	Ducloux	8
Potassium ferrocyanide	E	IX	None given	Ducloux	8
Reinecke's salt } Chromium tetrathiocyanate }	E	X	None given	Ducloux	8
Chlorauric acid in HCl	E	VI	On solid (10 γ)	Fulton	19
Chlorauric acid in H_3PO_4-HOAc (2:1)	E	VI	On solid (10 γ)	Fulton	19
Chlorauric acid in (1+1)H_2SO_4	E	VI	On solid (5 γ)	Fulton	19
Bromoplatinic acid in (2+3)H_2SO_4	E	VII	On solid (5 γ)	Fulton	19
Picric acid	F	XIII	1:1,000 – 1:5,000	Vidic	39
Picrolonic acid	F	XIII	1:5,000	Vidic	39
Styphnic acid	F	XIII	1:5,000	Vidic	39
Bismuth iodide potassium iodide	E	VIII	1:50	Farmilo	10
Reinecke's salt	E	X	1:3,200	Farmilo	10
Chloroplatinic acid	E	VI	1:10,000	Farmilo	10
Nitric acid	B	II	1:20	Wickstrøm	44
Potassium iodide	D	V	None given	Keenan	24
Picrolonic acid	F	XIII	None given	Keenan	24
Sodium nitroprusside	E	IX	None given	Keenan	24

Table X

COMPARISON OF REAGENTS FOR AMIDONE AND PETHIDINE

Most sensitive tests in decreasing order for amidone and pethidine hydrochloride recommended by authors, not necessarily "best" tests

Reagent name	*Lowest concentration*	*Reference*	
Amidone:			
Mercuric bromide in HCl	1:51,200	Fulton	18
Mercuric chloride in HCl	1:12,800	Fulton	18
	1:50,000	Vidic	39
Platinum cyanide	1:51,200	Fulton	18
Iodine in 10 per cent HBr	1:25,600	Fulton	18
Chromium sulfate chloride	1:25,600	Fulton	18
Cadmium iodide in KI (1:2)	1:25,600	Fulton	18
		Schuldiner	37
Mercuric iodide in KI (1:2)	1:20,000	Hubach and Jones	22
Chlorauric acid in HI (1:05)	1:16,000	Lucas	28
Mercuric chloride (5 per cent)	1:4,000	Lucas	28
Zinc-chloriodide	1:1,000	Schuldiner	37
Potassium iodide (5 per cent)	1:100	Hubach and Jones	22
Bromine water (fresh)	1:200 – 1:1,000	Watson and Bowman	42
Iodine in KI (1:1) Wagners	1:1,000	Hubach and Jones	22
Potassium ferrocyanide	1:500	Hubach and Jones	22
Potassium ferrocyanide	1:500	Hubach and Jones	22
Chlorpalladous acid	1:50 – 1:200	Watson and Bowman	42
Pethidine:			
Chlorplatinic acid	1:10,000	Farmilo	10
Picric acid	1:5,000	Levine	27
		Vidic	39
Ammonium reineckate	1:3,200	Farmilo	10
Potassium iodide (5 per cent)	1:2,000	Levine	27
Chlorauric acid in HCl	10 γ (solid)	Fulton	19
Chlorauric acid in H_3PO_4	10 γ (solid)	Fulton	19
Bismuth, potassium iodide	1:50	Ducloux	8
Picrolonic acid	None given	Ducloux	8

E. RECOMMENDATIONS FOR THE CRYSTAL IDENTIFICATION OF PETHIDINE AND METHADONE

Pethidine

Ducloux (1943) did not give any specific recommendations as to the best reagents for dolantine (pethidine), but illustrated crystals with eleven reagents and mentioned one other as yielding crystals. These reagents included picric acid (0.25 per cent), picrolonic acid (in water and alcohol), chloroplatinic acid, mercuric chloride, and Reinecke's salt.[8]

Levine (1944) particularly recommended saturated aqueous picric acid, and Wagenaar's lead iodide reagent.[40] He pointed out that picric acid under the proper conditions gives two very distinct types of crystals, depending not upon concentration but upon whether or not the drop is stirred.[27]

Keenan (1946) described crystal tests, but of a different kind, using data for identifying the hydrochloride or the crystals obtained with potassium iodide or sodium nitroprusside by optical crystallography.[24] These crystals had been previously mentioned by Levine as secondary tests, without reference to the optical properties.[27] Wickstrøm (1950) also used optical crystallography on the crystals formed with nitric acid.[44]

Hanson (1946) recommended saturated aqueous picric and picrolonic acids.[21]

Vidic (1951) used saturated aqueous picric, styphnic and picrolonic acids.[39]

Notice might also be taken of Fulton's mention (1948) of crystals with dilute permanganic acid (0.2 per cent $KMnO_4$ in 1 normal H_2SO_4), applied directly to a little of the dry substance.[18]

Our article in 1950[10] illustrated crystals with Dragendorff's reagent, Reinecke's salt, potassium ferricyanide and chloroplatinic acid, all reagents previously used by Ducloux.[8] In the present article we also recommend, for direct addition to the dry substance, bromauric acid in water, and bromauric acid in concentrated hydrochloric acid. The latter was originally suggested to us by Fulton[19] in an unpublished communication.

Our recommendations are particularly platinic chloride for the aqueous solution, and either or both of the bromauric acid reagents mentioned for application directly to the solid narcotic.

Methadone

Methadone yields a wealth of crystals, and some very unusual reagents have been proposed for it.

There is a certain amount of agreement as to good tests with some of the more common reagents.

Fulton,[18] Lucas,[28, 29] and Vidic[39] have recommended mercuric chloride or mercuric chloride with hydrochloric acid; and Fulton, Schuldiner,[37] Lucas, and Vidic have recommended mercuric bromide or mercuric bromide with hydrochloric acid. We also illustrated these reactions in our previous article.[10] Demonceau[7] re-

commended mercuric chloride (5 per cent aqueous) alone and mixed with potassium bromide (40 per cent aqueous) in equal volumes, as a most sensitive reagent (1:30,000).

Watson and Bowman,[42] and Hubach and Jones,[22] recommended potassium ferrocyanide, Schuldiner[37] and Vidic[39] both used bromine in potassium bromide solution.

Crystals with Marme's reagent were illustrated by Schuldiner and also by Hubach and Jones; both also illustrated crystals with potassium iodide. Marme's reagent was included by Fulton in a list of what he considered the twelve best crystal tests for methadone; for iodine in potassium iodide he recommended a form of the reagent with little iodine and considerable potassium iodide (0.15 g. iodine, 20 g. KI in 100 ml. water, designated as Bouchardat reagent no. 10, which was also included in his twelve best crystal tests. Vidic also recommended iodine in potassium iodide.

We now turn to consideration of the separate articles.

Fulton (1948) particularly recommended chromium sulfate chloride, iodine in 10 per cent hydrobromic acid, platinum cyanide reagent, and mercuric bromide with hydrochloric acid. Numerous other crystals were described but none were illustrated; a list of the twelve best tests for the aqueous solution was given, and the best reagents for direct application to the dry substance were also discussed. The recommendation of platinic chloride with hydrochloric acid for the aqueous solution of methadone, ferric chloride in concentrated hydrochloric acid for the aqueous solution or in 17½ volume-per cent hydrochloric acid for direct application to the dry substance, chromium sulfate chloride for direct application as well as for use with the aqueous solution, and dilute permanganic acid (0.2 per cent $KMnO_4$ in 1 normal H_2SO_4) for direct application, may also deserve mention here.[18]

Schuldiner (1949) illustrated crystals with six reagents, and though he did not give a choice among them, iodine zinc chloride (an iodine reagent which is generally given the misnomer "zinc chloriodide") may be mentioned in addition to Marme's reagent, mercuric bromide, potassium iodoiodide, and potassium bromobromide.[37]

Watson and Bowman (1949) recommended very dilute bromine water (3.5 ml. saturated bromine water diluted to 100 ml.), and palladium chloride with hydrochloric acid (1 g. in (35 + 65) HCl), as well as potassium ferrocyanide.[42] Fulton mentioned palladium chloride with hydrochloric acid, though not of just the same formula, as giving "a peculiar mixed form of crystallization".[18]

Lucas (1949-1950) recommended a reagent obtained from gold chloride and hydrogen iodide and illustrated the crystals, as well as those with mercuric chloride and bromide.[28, 29]

Hubach and Jones (1950) mentioned eight crystals and illustrated seven, without specific recommendation among them. They give the sensitivity of Marme's, probably their best recommendation for the usual type of crystal test, as 1:10,000. They also gave optical properties and X-ray diffraction data for methadone hydrochloride.[22]

Vidic (1951) particularly recommended mercuric chloride with hydrochloric acid. He also recommended mercuric bromide, iodine in potassium iodide solution, and bromine in potassium bromide, as already mentioned.[39]

In our second article of this series (1950) crystals were illustrated with several reagents, including iodine in 10 per cent hydrobromic acid, mercuric bromide with hydrochloric acid, Bouchardat reagent no. 1, chloroplatinic acid with hydrochloric acid, and ferric chloride in concentrated hydrochloric acid.[10] Demonceau (1952) recommended sodium perchlorate (5 per cent aqueous) for a sensitive reagent; our second article (1950) illustrates the same perchlorate formed by means of ammonium perchlorate (5 per cent aqueous). In the present article, the crystals with chromium sulfate chloride are illustrated. This is a fine test, but we have found that the composition of the reagent is not fully understood (see above). We also include crystals with a new reagent, potassium thorium iodide.

Our recommendations are particularly: iodine in 10 per cent hydrobromic acid (crystallization trimorphous and tricolour); mercuric bromide with hydrochloric acid (more sensitive and perhaps somewhat more characteristic than mercuric chloride with hydrochloric acid); and Bouchardat no. 1 (iodine and KI each in 1 g. in 100 ml. water).

F. Some colour reactions for identifying synthetic narcotics

Experimental procedure for colour reactions

Standard techniques were used in making the spot-plate colour reactions: a small amount (0.1 mg.) of the powdered narcotic was placed in the spot-plate and a full drop of the reagent was added. The immediate colour obtained was recorded and the reaction was then observed at two minutes and five-minute intervals. The spot was stirred with a glass rod after the initial observation had been made. The colours obtained at each interval were compared with a standard colour chart.

The following Marquis', Wasicky's, Mecke's, Froehde's, Zernik's and Flueckiger's colour reactions with acetyldehydrocodeinone (acedicon), methadone (iso) (isoamidone), methadone HBr (amidone HBr), codeine, cocaine dihydrocodeinone (dicodide), dihydromorphinone (dilaudid) pethidine (demerol), ethylmorphine (dionine), dihydroxycodeinone (eukodal), phenadoxone (heptalgin), diacetylmorphine (heroin), methorphinan (3-hydroxy-N-methylmorphinan), metopon,

morphine, alphaprodine (nisentil), papaverine, pipidone, thebaine and a number of other substances which are sometimes called narcotics have been studied. In each of the following sections, the reagent preparation and common colour reaction with morphine as a standard of comparison is given.

Marquis' reagent.[31] Formaldehyde in concentrated sulfuric acid.

This is one of the best known, most characteristic and most sensitive reagents for morphine. The complete reaction is given (even under adverse condition) with 0.03 mg. morphine and often 0.01 to 0.02 mg. will give the final blue colour. The use of only one drop of the reagent with 0.005 mg. morphine shows the red-purple colour.

The reagent consists of one to three drops of formaldehyde solution (37-40 per cent) in concentrated sulfuric acid (3 ml.). We have used two drops to 3 cc. as the standard. The reagent will not keep indefinitely.

The purple-red colour is given with phenolic opiates, or etheric opiates such as: apomorphine, codeine, dicodide, heroin, narcotine and with the phenol-etrahydrocannabinol (pyrahexyl). It is interesting to note that methorphinan, also a phenol, gives an orange colour.

The comparison of colours for other narcotics is given in chart II entitled "Marquis' reagent".

Wasicky's reagent.[41] Para-aminobenzaldehyde in concentrated sulfuric acid.

This reagent is another aldehyde-sulfuric acid reagent, and is more sensitive than Marquis' reagent toward morphine as a standard. Under favourable conditions of purity the orange colour is quite distinct with a 0.001 mg. morphine using one drop of the reagent; and 0.01 mg. will colour a "spot" full of reagent a good orange. There is no real succession of colours.

The reagent has been recommended by a number of authors according to Balls and Wolff[3] it was first proposed by Wasicky.[41] We made the reagent by dissolving p-aminobenzaldehyde (0.3 g.) in sulfuric acid (10 ml. ($8\frac{1}{2} + 1\frac{1}{2}$) H_2SO_4). Small variations from this formula do not appear to change the colours obtained very much.

Various phenolic and etheric narcotics give strong yellow, orange or red colours. Other phenols such as thymol, phenol and resorcin pyragallol will also give positive colours with the Wasicky reagent.

Wasicky's reagent does not give colours with narcotics belonging to the alkonamine, or non-phenolic arylpiperidines groups. It gives the orange colour with ketobemidone and bemidone. The colours of thirty-four substances are given in chart III entitled "Wasicky's reagent".

Froehde's reagent:[32] Molybdate in concentrated sulfuric acid.

Added to morphine an intense purple-red colour is obtained initially which fades within about three minutes to colourless, then develops to a bright green which, if the solution stands for about two hours in a test tube, become a pure, deep blue.

Froehde's reagent is very sensitive. A single drop, applied to a small dry deposit of morphine, strikes a noticeable purple red, fading with 0.001 mg. Under even most adverse conditions, and with stirring, the green colour develops within a few minutes of the time the red colour fades (with no more than 0.02 mg. morphine).

The reagent is prepared by dissolving 0.5 to 1 mg. of sodium (or ammonium) molybdate in concentrated sulfuric acid. More than 1 mg. per 100 ml. should not be used except in a definite variation of Buckingham's reagent. As little as 0.1 mg. (1 mg./ml.) is sometimes used. Solution of the salt is obtained by heating on the water bath.

The reagent is stable if kept stoppered and not exposed to air or moisture. The colour with morphine and other compounds is not due merely to lower oxides of molybdenum. The reagent has been tested with a large number of compounds.

The comparative colour reactions obtained with other narcotics than morphine are given in chart IV entitled "Froehde's reagent". Methorphinan may be distinguished from morphine by means of Froehde's reagent.

Mecke's reagent:[32] Selenious acid in concentrated sulfuric acid.

With morphine as a standard, Lafon's or Mecke's reagent strikes blue, changing to a stronger bluish-green, changing to an olive green and finally to brown.

The reagent is fairly sensitive, only 0.05 mg. of morphine is necessary. An indication of morphine can be obtained with 0.004 mg. of morphine.

The reagent is made by dissolving 0.5 g. of selenious acid in 100 cc. of concentrated sulfuric acid. Solution takes place readily at room temperature. The reagent may also be made by dissolving sodium selenate (0.75 g.) in sulfuric acid (100 ml.) Lafon also used selenate (0.5 — 10.0 g. sodium selenate in H_2SO_4,100 ml.) The colours with selenite, selenate and selenious acid reacting with the opiates are very similar.

The reaction of Mecke's reagent with codeine and dionine as with morphine are essentially as strong, unlike Froehde's reagent.

The reaction is evidently specific for the phenolic group but the colour obtained depends on the other functional groups adjacent to the phenol.

Chart II

MARQUIS' REAGENT

Narcotics		*Initially*	*Within 1 - 3 min.*	*Within 5 min.*
Acedicon	(1)	Yellow	Purple	Purple-blue
Amidone (Iso)	(2)	Colourless	Colourless	Pink
1-Amidone	(3)	Colourless	Colourless	Pink
d-Amidone	(4)	Colourless	Colourless	Pink
Amidone HBr	(5)	Colourless	Faint pink	Orange-red
Apomorphine HC1	(6)	Purple-red	Black	Black
Codeine phosphate	(7)	Purple-blue	Blue-purple	Blue-purple
Crytopine	(8)	Green	Blue	Blue
Cocaine HC1	(9)		No reaction	
Cotarnine	(10)	Olive-green	Orange-green	Green-yellow
Dicodid	(11)	Purple-red	Purple	Purple-blue
Dilaudid HC1	(12)	Yellow	Orange-red	Purple-red
Demerol HC1	(13)	Colourless	Orange	Bright orange
Ethylmorphine HC1	(14)	Orange-red	Deep purple	Blue-purple
Ethyl narceine	(15)	Purple-orange	Orange-red	Orange-red
Eukodal	(16)	Bright yellow	Purple	Purple-blue
Heptalgin	(17)	Colourless	Faint pink	Faint orange
Heroin HC1	(18)	Purple-red	Purple	Purple-blue
Meconic acid	(19)	Colourless	Faint pink	Faint pink
Methorphinan HBr	(20)	Orange	Olive-green	Dark green
Metopon HC1	(21)	Yellow-orange	Red-purple	Purple
Morphine	(22)	Purple-red	Purple	Purple-blue
Narceine	(23)	Red-orange	Orange-red	Orange-red
Narceine HC1	(24)	Red-orange	Orange-red	Orange-red
Narcotine	(25)	Purple	Olive-green	Green-yellow
Narcotine HC1	(26)	Purple	Olive-green	Green-yellow
Nisentil	(27)	Orange	Red-orange	Red-orange
Opianic acid	(28)	Colourless	Light green	Colourless
Papaverine	(29)	Colourless	Purple	Purple
Papaverine HC1	(30)	Colourless	Purple	Purple
Pipidone	(31)	Colourless	Colourless	Faint pink
Pyrahexyl	(32)	Purple	Purple-blue	Purple-blue
Physeptone	(33)	Colourless	Faint pink	Orange
Thebaine	(34)	Red-orange	Red-orange	Red-orange

Chart III

WASICKY'S REAGENT

Narcotics		*Initially*	*Within 1 - 3 min.*	*Within 5 min.*
Acedicon	(1)	Orange-yellow	Orange-red	Orange-red
Amidone (Iso)	(2)		No reaction	
1-Amidone	(3)		No reaction	
d-Amidone	(4)		No reaction	
Amidone HBr	(5)		No reaction	
Apomorphine HC1	(6)	Red-orange	Red-orange	Orange-yellow
Codeine phosphate	(7)	Orange-yellow	Orange-red	Orange-red
Crytopine	(8)	Colourless	Pale red-orange	Purple
Cocaine HC1	(9)		No reaction	
Cotarnine	(10)	Green	Yellow-green	Green-yellow
Dicodid	(11)	Colourless	Pale orange-yellow	Orange
Dilaudid HC1	(12)	Colourless	Pale orange-yellow	Orange
Demerol HC1	(13)		No reaction	
Ethylmorphine HC1	(14)	Orange-red	Red-orange	Red-orange
Ethyl narceine	(15)	Yellow-green	Olive-green	Dark green
Eukodal	(16)	Colourless	Faint orange	Orange
Heptalgin	(17)		No reaction	
Heroin HC1	(18)	Orange-yellow	Orange-red	Orange-red
Meconic acid	(19)		No reaction	
Methorphinan HBr	(20)	Yellow	Orange-purple	Purple
Metopon HC1	(21)	Colourless	Pale orange-yellow	Orange-yellow
Morphine	(22)	Orange-yellow	Orange-red	Orange-red
Narceine	(23)	Bright yellow	Orange-yellow	Orange-yellow
Narceine HC1	(24)	Bright yellow	Orange-yellow	Orange-yellow
Narcotine	(25)	Bright green	Olive-green	Green-black
Narcotine HC1	(26)	Bright green	Olive-green	Green-black
Nisentil	(27)		No reaction	
Opianic acid	(28)		No reaction	
Papaverine	(29)	Red-orange	Red-orange	Red-orange
Papaverine HC1	(30)	Red-orange	Red-orange	Red-orange
Pipidone	(31)		No reaction	
Pyrahexyl	(32)	Red	Red	Red-purple
Physeptone	(33)		No reaction	
Thebaine	(34)	Orange-yellow	Yellow-orange	Orange

Chart IV

FROEHDE'S REAGENT

Narcotics		*Initially*	*Within 1 - 3 min.*	*Within 5 min.*
Acedicon	(1)	Green	Yellow-orange	Yellow-green
Amidone (Iso)	(2)		No reaction	
l-Amidone	(3)		No reaction	
d-Amidone	(4)		No reaction	
Amidone HBr	(5)	Colourless	Faint yellow	Faint green
Apomorphine HCl	(6)	Dark green	Blue-green	Blue
Codeine phosphate	(7)	Light green	Green	Greenish-blue
Crytopine	(8)	Purple-red	Blue	Blue
Cocaine HCl	(9)		No reaction	
Cotarnine	(10)	Green	Green	Orange-red
Dicodid	(11)	Faint yellow-orange	Yellow-orange	Orange-red
Dilaudid HCl	(12)	Purple-blue	Orange-red	Orange-yellow
Demerol HCl	(13)		No reaction	
Ethylmorphine HCl	(14)	Yellow-orange	Green	Green-blue
Ethyl narceine	(15)	Green	Blue	Blue
Eukodal	(16)	Yellow-orange	Yellow-orange	Almost colourless
Heptalgin	(17)	Colourless	Faint yellow	Faint yellow
Heroin HCl	(18)	Purple-red	Orange-red	Green
Meconic acid	(19)		No reaction	
Methorphinan HBr	(20)	Green	Blue	Almost colourless
Metopon HCl	(21)	Purple-blue	Faint purple	Green
Morphine	(22)	Purple-red	Almost colourless	Green
Narceine	(23)	Orange-yellow	Green	Darker green
Narceine HCl	(24)	Orange-red	Green	Orange-yellow
Narcotine	(25)	Green	Olive-green	Orange-red
Narcotine HCl	(26)	Green	Olive-green	Orange-red
Nisentil	(27)		No reaction	
Opianic acid	(28)	Green	Greenish-yellow	Yellow-green
Papaverine	(29)	Faint green	Green-blue	Blue-green
Papaverine HCl	(30)	Gray	Green	Green-yellow
Pipidone	(31)		No reaction	
Pyrahexyl	(32)	Deep red	Deep red	Deep red
Physeptone	(33)	Colourless	Faint greenish-yellow	Greenish-yellow
Thebaine	(34)	Orange-red	Orange-yellow	Orange-yellow

A comparison of colour reactions of narcotics with Mecke's reagent is shown in chart V entitled "Mecke's reagent".

Flueckiger's reagent:[11] titanic acid in concentrated sulfuric acid.

This reagent with morphine strikes a dull purple or maroon colour, dissolving maroon red, soon changing to plain red, gradually becoming scarlet.

The reagent is prepared by digesting titanic acid anhydride (0.2 — 0.5 g.) in sulfuric acid (100 cc. conc.) for several hours at 140 — 160° C. This treatment will dissolve the oxide although it dissolves with difficulty.

The reagent will produce colours with 0.001 mg. of morphine and is about as sensitive as Froehde's, but the colour does not appear as promptly. 0.01 mg. morphine will colour a "spot" full of reagent a good maroon red, 0.04 mg. morphine will give the complete reaction.

With phenolic compounds in general the titanic reagent is very reactive. The colours vary from orange to scarlet red.

The colour reactions obtained with narcotics are given in chart VI entitled "Flueckiger's reagent".

Zernik's reagent:[45] concentrated nitric acid.

Nitric acid (conc.) added to morphine or its salts gives strong red or orange red colour soon fading through orange to yellow. The salts give a stronger colour than the free base. A red-orange can be noticed with 0.5 mg. of morphine.

The reagent is used as a routine test for morphine. It is the test commonly relied on by narcotic analysts and police agents for tentative identification in the field. It is perhaps the only good colour reaction in which codeine resembles morphine more closely than does heroin. Codeine turns orange and heroin gradually becomes bright green. It is the latter reaction which has given the name Zernik to the reagent. Phenols appear to give the reactions similar to morphine* The reactions with other narcotics are shown in chart VII entitled "Zernik's reagent".

* The colour reactions for morphine, studied above, were examined in great detail in a monograph by C. C. Fulton which is as yet unpublished, but would be of considerable benefit to narcotic analysts. This monograph was kindly lent to us by C. C. Fulton, United Nations Secretariat.

Chart V

MECKE'S REAGENT

Narcotics		*Initially*	*Within 1 - 3 min.*	*Within 5 min.*
Acedicon	(1)	Bright yellow	Green	Blue-green
Amidone (Iso)	(2)		No reaction	
1-Amidone	(3)		No reaction	
d-Amidone	(4)		No reaction	
Amidone HBr	(5)	Yellow	Orange-yellow	Orange-yellow
Apomorphine HCl	(6)	Black	Black	Black
Codeine phosphate	(7)	Green	Blue	Blue
Crytopine	(8)	Blue-green	Blue	Purple-blue
Cocaine HCl	(9)		No reaction	
Cotarnine	(10)	Green	Olive-green	Orange-green
Dicodid	(11)	Blue-green	Blue	Blue
Dilaudid HCl	(12)	Yellow	Blue-green	Blue-green
Demerol HCl	(13)		No reaction	
Ethylmorphine HCl	(14)	Green	Blue-green	Blue-green
Ethyl narceine	(15)	Green	Blue-black	Purple-blue
Eukodal	(16)	Bright yellow	Olive-green	Blue-green
Heptalgin	(17)		No reaction	
Heroin HCl	(18)	Green-blue	Blue-green	Blue-green
Meconic acid	(19)		No reaction	
Methorphinan HBr	(20)	Bright yellow	Purple	Purple
Metopon HCl	(21)	Orange-yellow	Green	Blue
Morphine	(22)	Blue	Blue-green	Blue-green
Narceine	(23)	Yellow-green	Orange-red	Purple-red
Narceine HCl	(24)	Green	Red-orange	Purple-red
Narcotine	(25)	Green	Blue-black	Purple
Narcotine HCl	(26)	Green	Purple-red	Red-orange
Nisentil	(27)	Green-yellow	Orange-red	Orange-yellow
Opianic acid	(28)	Green-yellow	Yellow-green	Green-yellow
Papaverine	(29)	Blue-green	Purple-black	Blue-black
Papaverine HCl	(30)	Olive-green	Purple-black	
Pipidone	(31)		No reaction	
Pyrahexyl	(32)	Orange-red	Orange-yellow	Dark orange-red
Physeptone	(33)	Colourless	Pale yellow-orange	Pale yellow-orange
Thebaine	(34)	Orange-yellow	Green	Orange-yellow

Chart VI

FLUECKIGER'S REAGENT

Narcotics		*Initially*	*Within 1 - 3 min.*	*Within 5 min.*
Acedicon	(1)	Colourless	Pale orange-red	Pale orange-red
Amidone (Iso)	(2)		No reaction	
1-Amidone	(3)		No reaction	
d-Amidone	(4)		No reaction	
Amidone HBr	(5)		No reaction	
Apomorphine HCl	(6)	Purple-red	Purple-red	Dark purple-red
Codeine phosphate	(7)	Colourless	Pale purple-blue	Purple-blue
Crytopine	(8)	Orange-purple	Purple-blue	Bluish-black
Cocaine HCl	(9)		No reaction	
Cotarnine	(10)	Olive-green	Orange-red	Orange-red
Dicodid	(11)		No reaction	
Dilaudid HCl	(12)	Red-orange	Red-orange	Red-orange
Demerol HCl	(13)		No reaction	
Ethylmorphine HCl	(14)	Colourless	Faint purple	Purple
Ethyl narceine	(15)	Orange-yellow	Orange-red	Orange-red
Eukodal	(16)	Colourless	Pale purple	Pale purple
Heptalgin	(17)		No reaction	
Heroin HCl	(18)	Purple-red	Purple-red	Orange-red
Meconic acid	(19)		No reaction	
Methorphinan HBr	(20)	Red-orange	Red-orange	Red-orange
Metopon HCl	(21)	Red-orange	Red-orange	Red-orange
Morphine	(22)	Purple-red	Purple-red	Red-orange
Narceine	(23)	Orange-yellow	Orange-yellow	Orange-red
Narceine HCl	(24)	Orange-red	Orange-red	Orange-red
Narcotine	(25)	Yellow	Orange-red	Orange-red
Narcotine HCl	(26)	Yellow-green	Orange-red	Orange-red
Nisentil	(27)		No reaction	
Opianic acid	(28)	Yellow		Green
Papaverine	(29)	Colourless	Pale purple	Pale purple
Papaverine HCl	(30)	Bright purple	Purple	Purple-blue
Pipidone	(31)		No reaction	
Pyrahexyl	(32)	Deep red	Red	Red
Physeptone	(33)		No reaction	
Thebaine	(34)	Orange	Orange	Orange

Nitric acid has been the basis for developing colour reactions for demerol.[5] A mixture of sulfuric and nitric acids was used to nitrate the benzene ring, the nitro group was then reduced with Zn and the amine diazotized and phenolic group was then condensed with resorcinol or naphthol or phloroglucinol, all of which produced red or orange-red dyes. Condensation of the nitrated demerol with ketone (acetone) in basic solution produces a red-violet colour.

A similar series of reactions for the identification of the keto group in the ketone derivatives of the hydrophenanthrene alkaloids, such as metopon, diocodide, dilaudide, eucodal, as well as the alkoneamines such as amidones, was studied by Farmilo and Lucas.[9] In their method dinitrobenzene with the keto-narcotic in alcoholic solution were condensed by means of alkali, violet coloured products were obtained. Demonceau[7] stated that the absorption maxima of the coloured product with methadone at a wave length equals 525 mμ. The reaction appears to be specific for the presence of a keto group. A similar reaction has recently appeared for the colorimetric quantitative analysis of amidone obtained from tissues. In this method the phenyl groups are nitrated and the nitro-product of amidone is then condensed with methyl-ethyl ketone in alcoholic alkaline solution. The colour appeared to be relatively stable.

Demonceau[7] described a nitration reaction with diarylalkanoneamines, such as methadone and phenadoxone, in which the narcotic salt was nitrated with HNO_3, H_2SO_4. The hydrochloride was necessary for production of the rose colour. Powdered potassium nitrate could be used in place of HNO_3 to give the same reaction. Demonceau also mentioned the condensation reaction of the nitrated products with acetone to give a rose-coloured product. This reaction was termed semi-quantitative. The similarity between the reaction product colours obtained after nitration and ketone condensation with arylpiperidines and diaralkoneamines should be noted.

It was observed also that ketobemidone and hydroxypethidine give the phenol type colour reactions with Marquis', Froehde's, Mecke's, Wasicky's and Flueckiger's reagents.

Chart VII

ZERNIK'S REAGENT

Narcotics		*Initially*	*Within 1 - 3 min.*	*Within 5 min.*
Acedicon	(1)	Yellow-green	Yellow-green	Pale green
Amidone (Iso)	(2)		No reaction	
1-Amidone	(3)		No reaction	
d-Amidone	(4)		No reaction	
Amidone HBr	(5)	Pale orange-yellow	Pale orange-yellow	Colourless
Apomorphine HCl	(6)	Purple-red	Red-orange	Orange-red
Codeine phosphate	(7)	Yellow	Yellow-green	Green
Crytopine	(8)	Orange-yellow	Pale yellow	Yellow-green
Cocaine HCl	(9)		No reaction	
Cotarnine	(10)	Orange-yellow	Orange-yellow	Orange-yellow
Dicodid	(11)	Colourless	Pale yellow	Pale yellow
Dilaudid HCl	(12)	Yellow	Yellow-orange	Yellow-orange
Demerol HCl	(13)		No reaction	
Ethylmorphine HCl	(14)	Colourless	Yellow	Pale yellow
Ethyl narceine	(15)	Yellow	Red-orange	Orange yellow
Eukodal	(16)	Colourless	Pale yellow	Pale yellow
Heptalgin	(17)		No reaction	
Heroin HCl	(18)	Pale yellow	Pale yellow	Light green
Meconic acid	(19)		No reaction	
Methorphinan HBr	(20)	Yellow	Orange	Orange
Metopon HCl	(21)	Yellow	Faint yellow	Faint yellow
Morphine	(22)	Orange-red	Orange	Yellow
Narceine	(23)	Orange-yellow	Yellow-green	Yellow-green
Narceine HCl	(24)	Yellow	Pale yellow-green	Yellow-green
Narcotine	(25)	Orange	Yellow	Yellow
Narcotine HCl	(26)	Orange	Yellow	Yellow
Nisentil	(27)		No reaction	
Opianic acid	(28)		No reaction	
Papaverine	(29)	Yellow-green	Green	Green
Papaverine HCl	(30)	Yellow	Orange-yellow	Orange-yellow
Pipidone	(31)		No reaction	
Pyrahexyl	(32)	Red-orange	Red-orange	Red-orange
Physeptone	(33)		No reaction	
Thebaine	(34)	Yellow	Faint yellow	Faint yellow

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GENERAL NOTE CONCERNING THE PHOTOGRAPHS

Photographic methods

The photographs were taken using the same general procedure as described previously.[10] The method for determining correct photographic exposure for photomicrography is based on the comparative-image-evaluation principle.

Photographs

ALKANONEAMINES

Methadone (hydrochloride)

1. Solution 2 with potassium thorium iodide.
2. Solution 16 with chromium sulfate chloride.
3. Solution 16 with chromium sulfate chloride, typical crystals enlarged.
4. Solution 16 with chromium sulfate chloride, highly magnified crystals.

Pipidone (hydrochloride)

5. Solution 2 with chlorauric acid in acetic acid.

Phenadoxone (hydrochloride)

6. Solution 1 with picric acid (alcoholic).

Pethidine (hydrochloride)

7. Powdered pethidine (100 micrograms) with sodium bromaurate.
8. Powdered pethidine (100 micrograms) with bromauric acid in concentrated hydrochloric acid.

   Crystallization of the pethidine bromaurate complex is well advanced and quite characteristic.

Hydroxypethidine (hydrochloride)

9. Solution 4 with lead sodium iodide.
10. Solution 4 with lead sodium iodide.
11. Solution 2 with lead potassium iodide.
12. Solution 2 with Reinecke's salt.
13. Solution 2 with Reinecke's salt, enlargement of characteristic crystal group.

Alphaprodine (hydrochloride)

14. Solution 1 with aqueous picric acid.
15. Solution 1/2 with aqueous picric acid. Both are characteristic crystals.
16. Solution 2 with silver sodium iodide.
17. Solution 1 with silver sodium iodide.
18. Solution 1 with lead potassium iodide.
19. Solution 1 with lead potassium iodide.
20. Solution 1 with lead sodium iodide.
21. Solution 2 with lead sodium iodide.

Ketobemidone (hydrochloride)

22. Solution 4 with Reinecke's salt, earliest forms and most characteristic.
23. Solution 4 with Reinecke's salt, later forms.
24. Solution 4 with Reinecke's salt, much later forms.
25. Solution 4 with Reinecke's salt, enlargement of characteristic crystal.

    Pictures 22 to 25 inclusive illustrate three characteristic crystal habits and include an enlargement of a single most characteristic crystal.
26. Powdered solid narcotic (100 micrograms) with chloroplatinic acid.
27. Solution 16 with mercuric sodium nitrite. Shows a very characteristic starlike habit.

HYDROPHENANTHRENES

Methorphinan (hydrobromide)

28. Solution 8 with Reinecke's salt.
29. Solution 4 with Reinecke's salt.

    Pictures show the two characteristic forms of crystals which depend on concentration of narcotic solution.

Metopon (hydrochloride)

30. Metopon 2 per cent solution with disodium methylarsonate. Shows characteristic crystals of what appears to be the free base.
31. Metopon 0.05 per cent with picrolonic acid.

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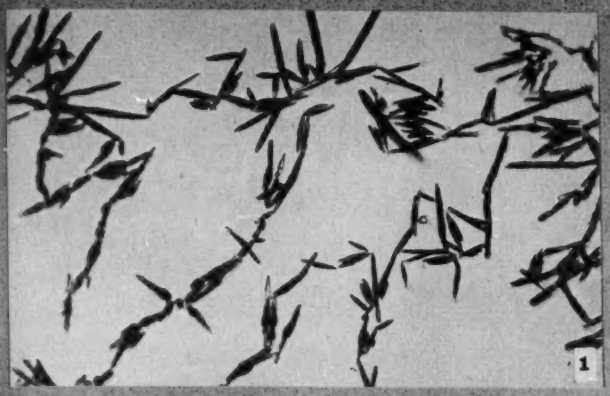
III. Wasicky's reagent.
IV. Froehde's reagent.
V. Mecke's reagent.
VI. Flueckiger's reagent.
VII. Zernick's reagent.

Micro photographs of Synthetic Narcotics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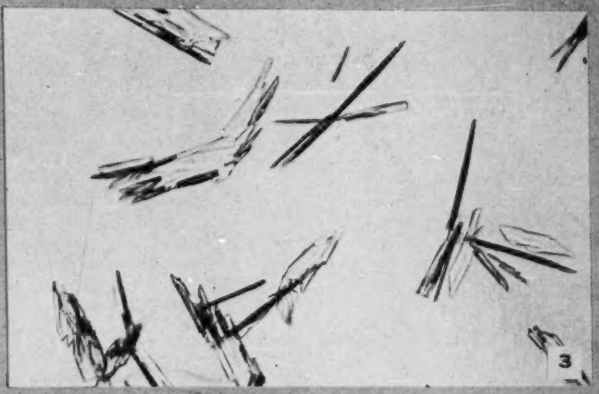
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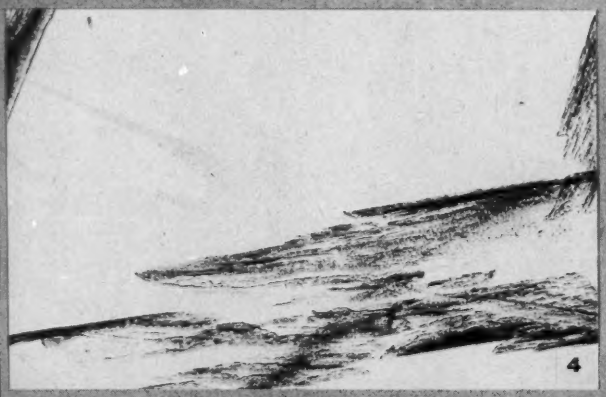
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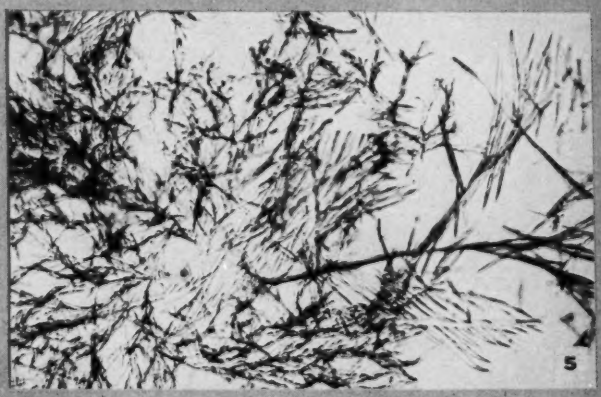
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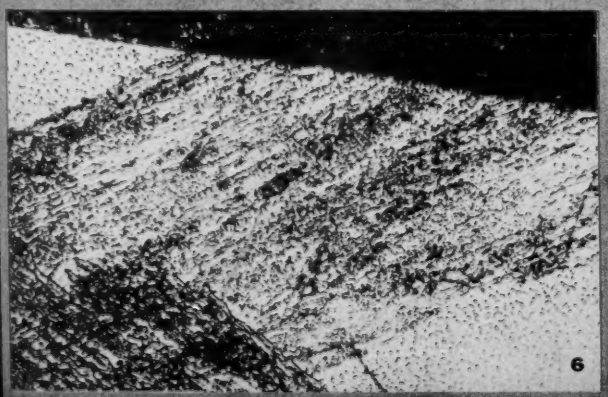
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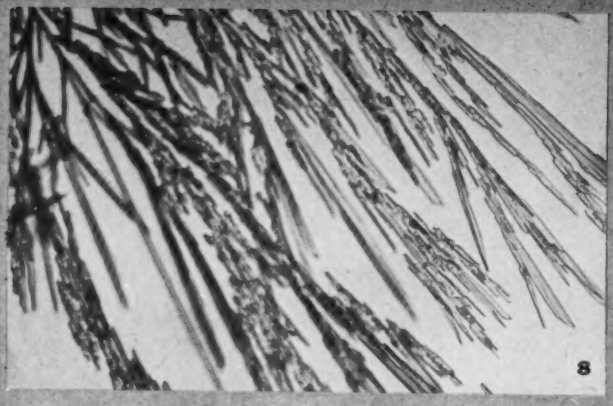
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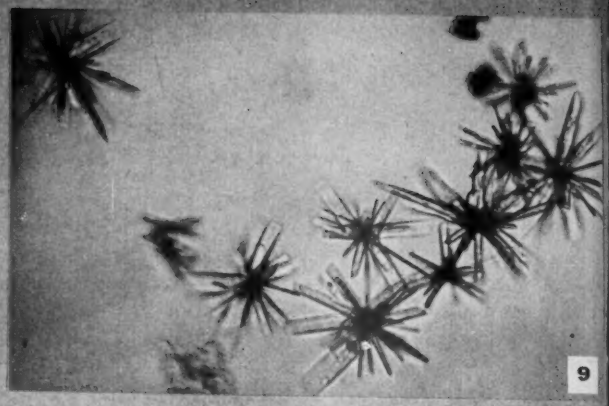
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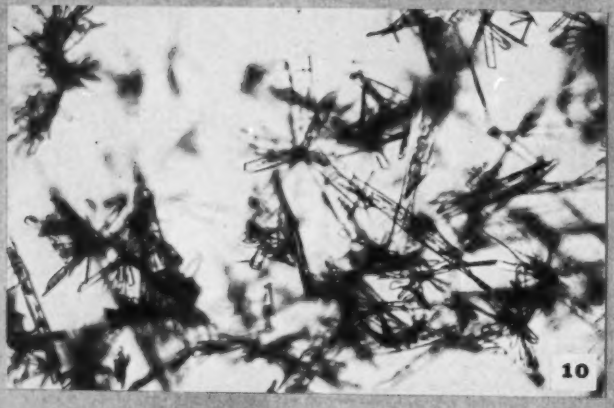
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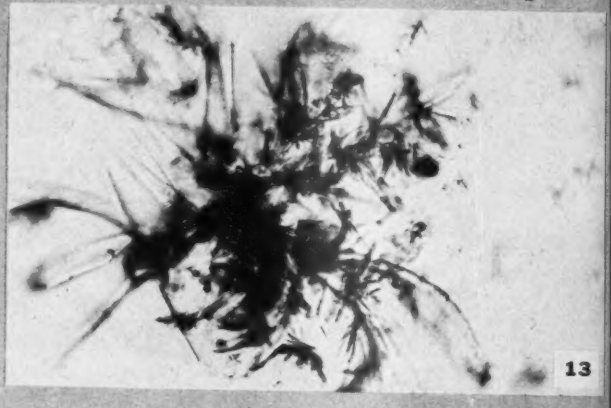
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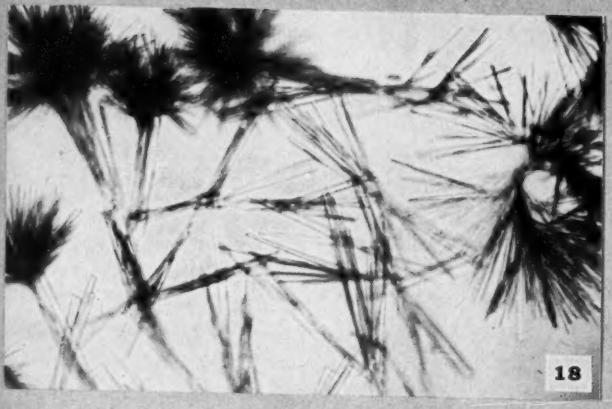
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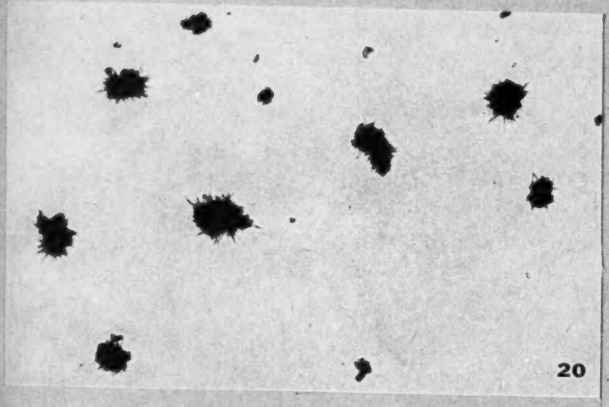
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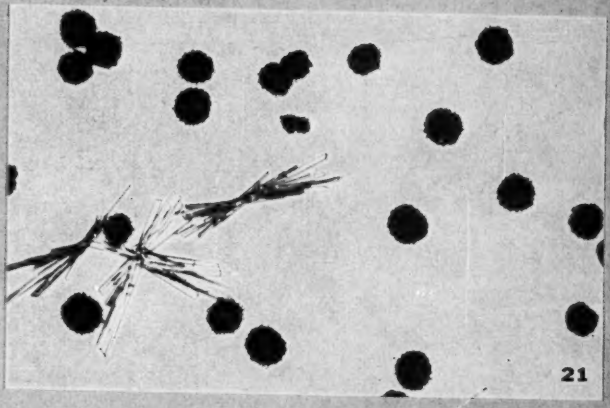
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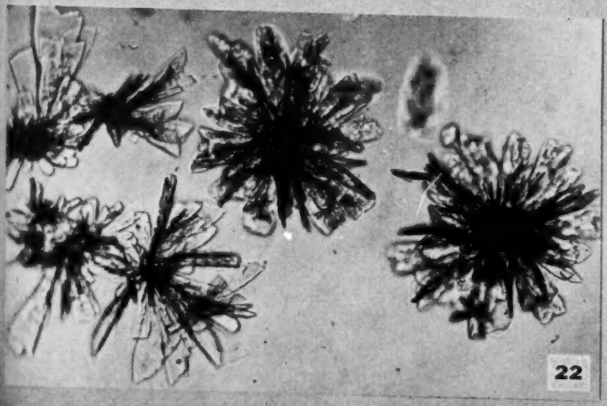
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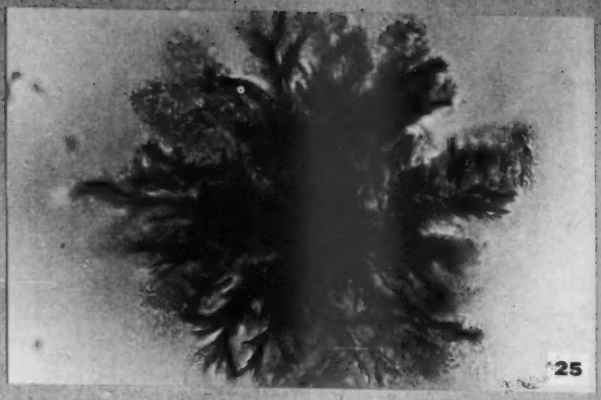
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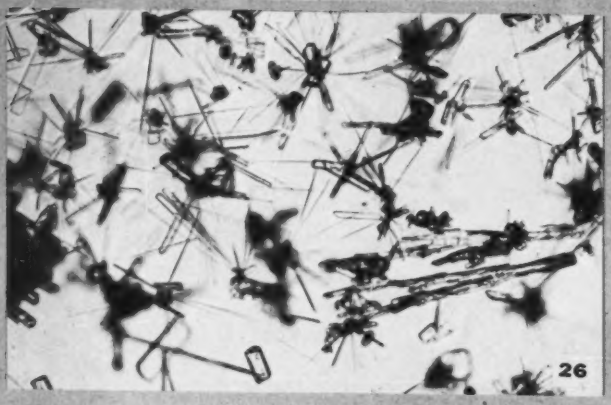
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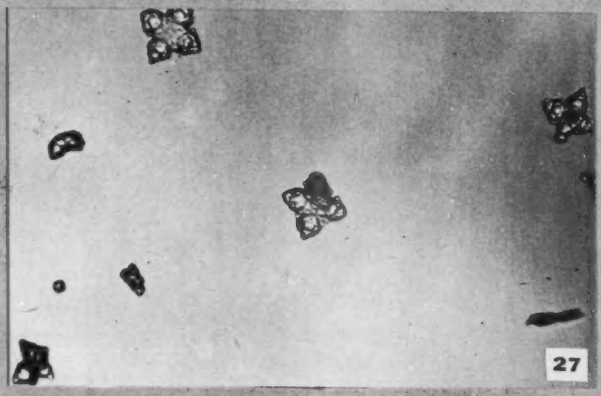
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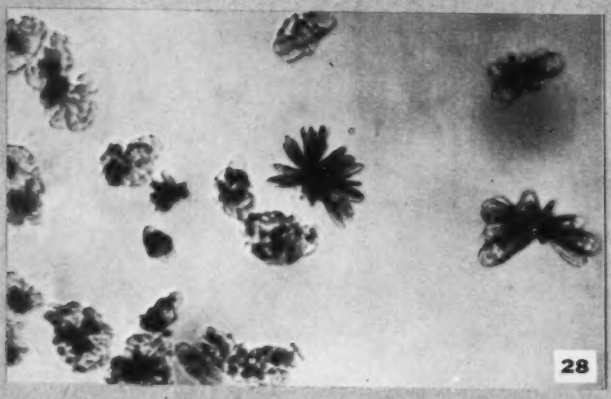
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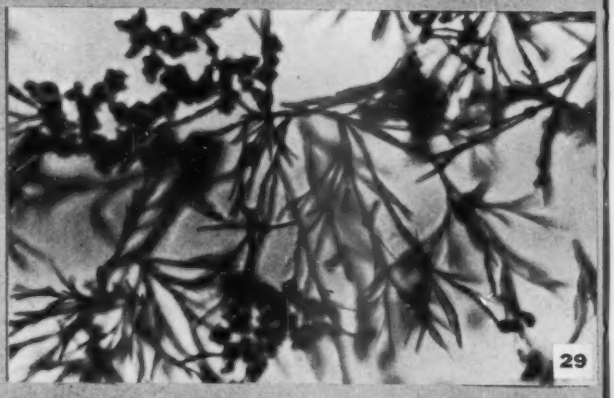
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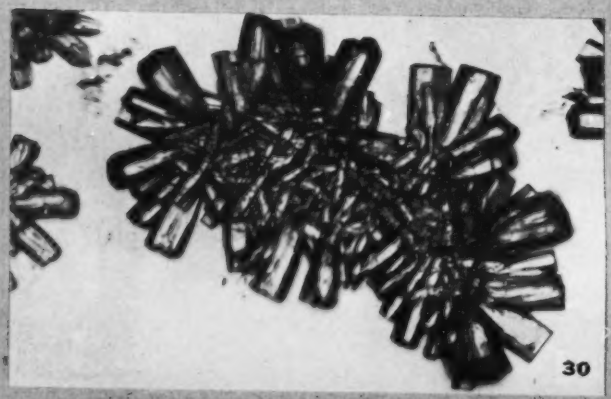
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REFERENCES

[1] Association of Official Agricultural Chemists, *Official Methods,* 7th edition, 1950, chapt. 32; Drugs 32.151-32.156, Microchemical tests for alkaloids 32.151-32.154; pp. 601-605; for Synthetics 32.155-32.156, pp. 605-609.

[2] Amelink, F., Amsterdam, 1934, "Schema zur mikrochemischen Identifikation von Alkaloiden" (Ubereetzt von marge haur), *N.V.D.B. Centen's Uitgevers Maatschappij.*

[3] Balls, A. K., and Wolff, W. A., "Determination of Morphine", *Jour. Biol. Chemm.,* LXXX, 379 (1928).

[4] Behrens, H., "Anleitung zur mikrochemischen Analyse", vol. iii, 1st edition, 1896.

[5] D'Alessio de Carnevale Bonino, Rosa C., "Some reactions of ethyl 1-methyl-4-phenylpiperidine-4-carboxylate hydrochloride or dolantine, and methods of determination" (translated title), *La Semana Méd.* (Buenos Aires) *1,* 289-293 (1943).

[6] Denoël, A. and Soulet, U., "Study of some synthetic derivatives of morphine and codeine", *Journal de Pharmacie de Belgique,* part I, p. 34, vol. 1 (March 1942); part II, pp. 50-55 (April 1942).

[7] Demonceau, J., "Contribution à l'étude analytique de la Méthadone", *Journal de Pharmacie de Belgique,* septième année, nouvelle série, nos. 1-2, janvier-février, pp. 36-45 (1952).

[8] Ducloux, E. H., "Notas Microquímicas sobre 'Doping', Buenos Aires (1943)".

[9] Farmilo, C. G., and Lucas, G. H. W., "Studies on the Identification of Narcotics, I, Microchemical (Color) Reactions for Identification of Metopon", *Journal of the American Pharmaceutical Association,* Scientific edition, vol. XXXVIII, no. 9, 491-495, September 1949.

[10] Farmilo, C. G., Ross, R. J. Berry and Kennett, P. M. L., "Microchemical Identification of Synthetic Narcotics; Amidone, Heptalgin, Demerol, Pipidone" (Studies on the Identification of Narcotics, II), *Bulletin on Narcotics,* vol. II, no. 2, April 1950 (12 pp., 28 illus.).

[11] Flueckiger, F. A., February 1880, cited in the Dispensatory of the United States of America, edited by Remington, J. P., Wood, H. C. and others, 20th edition, J. B. Lippincott & Co., Philadelphia.

[12] Froehde, A., *Archiv der Pharm.* 1866, 54.

[13] Fulton, Charles C., "The Precipitating Agents for Alkaloids", *Am. Jour. Pharm.* 104, 244-271 (1932).

[14] Fulton, C. C., "Alkaloids and Their Reagents", *American Journal of Pharmacy,* III, no. 5, 183-191 (1939).

[15] Fulton, C. C., "New Precipitating Agents for Alkaloids and Amines", *Am. Jour. Pharm. 112,* 1-35 (1940).

[16] Fulton, C. C., "Micro-Crystal Identification Tests for Morphine, Heroin, Dilaudid and Cocaine", *J. of Crim. Law and Criminology,* XXXII, no. 3, 359-365 (1941).

[17] Fulton, C. C., "Notes on Micro-Crystal Tests for Alkaloids and Amines Chiefly in Aqueous Solution" (unpublished data), September 1942 (3rd edition).

[18] Fulton, C. C., "Identification of Methadone by Microcrystals", United Nations document E/CN.7/117, pp. 17-31, 27 February 1948.

[19] Fulton, C. C., "Microcrystal Reagents for the Direct Application to the Dry Narcotic Demerol" (unpublished data), private communication, 11 December 1949.

[20] Cross, S. T., and Oberst, F. W., "Micro Analysis of Opiates by X-ray diffraction", *Journal of Lab. and Clin. Med. 32,* 94-101 (1947).

[21] Hanson, Arne, "The Identification of Opiates and Narcotics", (in English), *Svensk Kemisk Tidschrift 58,* 10-23 (1946).

[22] Hubach, C. E., and Jones, F. T., "Methadon Hydrochloride, Optical Properties, Microchemical Reactions and X-ray Diffraction Data", *Analytical Chemistry 22,* 595-598 (1950).

[23] Isbell, H., "The Addiction Liability of Some Derivatives of Meperidine", *The Jour. of Pharm. and Exper. Therap. 97,* 182-189 (1949).

[24] Keenan, G. L., "The Microscopic Identification of Demerol", *Journal of the American Pharmaceutical Association,* Scientific edition 35, 338-339 (1946).

[25] Keenan, G. L., "Notes on the Microscopy of some Important Alkaloids", *The Chemist Analyst 39,* 33, 52, 79 (1950), *ibid., 40,* 4, 28 (1951).

[26] Levi, L., and Farmilo, C. G., "The Characterization of Narcotics as Reineckates", *Canadian Journal of Chemistry,* 30: 783-792, October 1952.

[27] Levine, J., "The Identification of Demerol Hydrochloride", *Industrial and Engineering Chemistry,* Analytical edition *16,* 408-410 (1944).

[28A] Lucas, G. H. W., "Detection of Amidone", Dept. of Pharmacology, University of Toronto, Toronto, Can. Report to the Dept. of National Health and Welfare, Food and Drug Laboratories, 22 July 1948.

[28B] Lucas, G. H. W., "Color and Crystal Tests for the Identification of Methadon and Isomethadon", *Federation Proceedings, 8,* 317 (1949).

[29] Lucas, G. H. W., "Crystal Tests as a Means of Identifying Alkaloids", *Can. Jour. of Research 28,* 37-42 (1950).

[30] Martini Ardiono, "Uebereine neue empfindliche mikrochemische Reaktion des Kokains", *Microchemie 12,* 111 (1932/33).

[31] Marquis. Ed. Magister Dissertation 1896, Surjew.; Arb. Der Pharm. Inst. zu Dorpat 15, 117 (1896); Pharmazeutische Zantralhalle für Deutschland 1896, 814. (Cited in various sources; original references not available).

[32] Mecke, "Ein Neues Reagens auf Alkaloide, Nachweis von Opium", *Zeitschr. öffentl. Chem., 25,* 351 (1899) (original reference not available to authors) cited in *Merck's Index,* 5th edition, 1940, published by Merck and Co. Inc., Rahway, N. J., p. 878, "Chemical, Clinico-Chemical Reactions, Tests and Reagents", no. 3325. See also Levine, V. E., "Studies in Toxicologic Chemistry, I. The Detection of the Opium Alkaloids by Selenious — Sulfuric Acid: The specificity of This Reagent for the Phenolic Group". *J. of Lab. and Clin. Med.* XI, no. 9, 809-816 (1926).

[33] Patterson, A. M., and Capell, L. T., "A List of Ring Systems Used in Organic Chemistry", *Ring Index*, Reinhold Publishing Corporation, New York, 1940. Compound no. 3094, p. 425.

[34] Rosenthaler, L., "Toxikologische Mikroanalyse — Qualitative Mikrochemie der Gifte im gerichtlich-chemikal wichtiger Stoffe", *Verlag. von Gebrüder Borntraeger*, Berlin, 1935, pp. 358-362.

[35] Small, L. F., and Lutz, R. E., "Chemistry of the Opium Alkaloids", U. S. Govt. Printing Office, Washington, 1932. Supplement no. 103 to the Public Health Reports.

[36] Small L. F., "Chemistry of Natural and Synthetic Analgesics", *Annals of the New York Academy of Sciences 51*, 12-20 (1948). Structure of Metopon, pp. 18, 19.

[37] Schuldiner, J. A., "Identification of Amidone", *Analytical Chemistry 21*, 298-300 (1949).

[38] Stephenson, C. H., and Parker, C. E., "Microchemical Tests for Alkaloids", J. B. Lippincott Co., Phil., 1921.

[39] Vidic, E., "Der Nachweis con Polamidon and Dolantin im Urin und Ihre Trennung von Morphin", *Arch. exper. Path. u. Pharmakol*, Bd. *212*, S. 339-351 (1951).

[40] Wagenaar, C. H., "Microchemical Alkaloid Reactions with a New Reagent Containing Lead Iodide" (translated title), *Pharm. Weekblad 76*, 276 (1939) (see also *Chemical Abstracts 33*, 4375 (1939)).

[41] Wasicky, *Zeit. für. Anal. Chem.* (1915), p. 394.

[42] Watson, R. C. and Bowman, M. I., "Microchemical Identification of Amidone", *Journal of the American Pharmaceutical Association*, Scientific edition *38*, 369-373 (1949).

[43] Whitmore, W. F., and Wood, C. A., "Chemical Microscopy of Some Toxicologically Important Alkaloids", *Microchemie 27*, 249-334 (1939).

[44] Wickstrøm, A., "The Optical Crystallographic Properties of Crystals Formed with Nitric Acid from Pethidine, Nicotinamide and Cincophen", *Journal of Pharmacy and Pharmacology 2*, 444-445 (1950).

[45] Zernik: Ber. deut. pharm. Geo. 1903, 67, cited in *Merck's Index*, p. 970. Test no. 4483. Many other chemists have recommended nitric acid, the name Zernik is used for convenience only. See also: Fulton, C. C., "The Principal Chemical Tests for Morphine", *Amer. Jour. of Pharm. 109*, no. 5, 1-22 (1937).

A Summary of the Discussions and Decisions of the Economic and Social Council on Questions concerning Narcotic Drugs

Fourteenth session: 19 May–1 August 1952

The following items concerning narcotic drugs were on the agenda of the fourteenth session of the Economic and Social Council:

I. International limitation of opium production;

II. Report of the Commission on Narcotic Drugs on its seventh session;[1]

III. Date and place of the eighth session of the Commission on Narcotic Drugs;

IV. Report of the Permanent Central Opium Board to the Economic and Social Council on statistics of narcotics for 1950 and the work of the Board in 1951;

V. Approval of the appointment of the Secretary of the Permanent Central Opium Board;

VI. Date of election of five fixed-term members of the Commission on Narcotic Drugs;

VII. Election of members of the Permanent Central Opium Board;

VIII. Invitation to Libya to become a party to the Protocol of 19 November 1948 bringing under international control drugs outside the scope of the Convention of 13 July 1931 as amended by the Protocol of 11 December 1946;

IX. Communication to governments of findings of the World Health Organization under article 8 of the 1925 Convention, as amended by the Protocol of 11 December 1946.

I

International limitation of opium production

It will be recalled that, at its thirteenth session, the Council had asked governments to send to the Secretary-General their observations both on the draft interim agreement to limit the production of opium to medical and scientific needs and on the principles of the proposed protocol relating to the limitation of production of opium; at the same time, it had requested the Secretary-General to prepare an annotated compendium of such observations as he should receive and to draft the protocol in legal form. These instructions were duly carried out, and when the Council reached this item of its agenda, members had before them the resulting documentation.

During the first meeting, it became clear that the Council, taking into account the available comments of governments and the opinions expressed by many of its members, was convinced that the scheme proposed by the Commission and embodied in the draft protocol provided at the present juncture the only basis on which a multilateral agreement to limit opium production could be reached.

The discussion accordingly centred around the question whether the Council should decide immediately to convene an international conference for concluding the protocol or postpone doing so until it should have more concrete evidence on the attitudes of governments. The first procedure was favoured by the delegations of Belgium, Egypt, France and the United States of America who sponsored a joint draft resolution which included a provision to that effect. The representatives of China, Sweden and the United Kingdom of Great Britain and Northern Ireland proposed a joint amendment thereto that the decision to call the conference should be put off until governments had been given an opportunity to furnish comments on the text of the draft protocol, as well as on the general principles. The opinion was expressed that the proposed protocol had "manifest shortcomings" and that the present draft would have to be "revised fundamentally" before it could be submitted to the conference. It was replied that thirty-seven governments, including most of the important producing and consuming countries, had already commented on the principles and that since the idea of holding a conference to limit opium production had

[1] Draft resolutions submitted by the Commission on Narcotic Drugs in the report on its seventh session to the Council were summarized in the *Bulletin*, vol. IV, no. 2.

been under study for some time and the illicit traffic in opium and its derivatives was steadily increasing, a further delay of the conference for one year could not be justified. The latter view prevailed, and the Council rejected the joint amendment (except for a small change in the preamble).

The Council then adopted the joint draft resolution, substantially as proposed. In addition to the decision to call the conference, it provided for the Secretary-General to set the date of the conference "preferably after the conclusion of the eighth session of the Commission on Narcotic Drugs", to dispatch the necessary invitations to governments and to the specialized agencies to be represented at the conference table, to prepare provisional rules of procedure for the conference, and to invite governments to furnish observations on the draft protocol by 1 December 1952 so that the Secretariat might prepare a compilation of them to be in the hands of delegates six weeks before the opening of the conference.

The Council adopted a calendar of conferences for 1953 in accordance with which the conference would sit from 11 May to 19 June 1953. It was noted, however, that those dates might have to be changed if the governments concerned could not be ready at that time.

II

Report of the Commission on Narcotic Drugs on its seventh session

The Council decided to refer the matter of the time and place of the Commission's eighth session to its Interim Committee on Programme of Conferences (see section III below). The Council acted on the other recommendations of the Commission before taking note of the report as a whole.

The Commission's draft resolutions on international co-operation to control the illicit traffic in narcotics and on the control of synthetic narcotic drugs were adopted by the Council without amendment.

The Council also considered the Commission's draft resolution on illicit trafficking by the crews of merchant ships and civil aircraft, as well as two amendments thereto proposed by the representative of the United Kingdom, the first being a drafting change in paragraph 2 (*a*) (ii) and the second comprising an addition to paragraph 2 (*b*) to enable all shipping and aircraft organizations to receive copies of the list of trafficking crew members. The Council adopted the first amendment, with a slight modification proposed by the representative of Egypt, and the second amendment and the entire amendment resolution.

Turning next to the Commission's recommendations regarding scientific research on narcotics, the Council examined a draft resolution proposed by the representative of the United States of America requesting governments "to send to the United Nations research laboratory for analysis samples of all opium seized in the illicit traffic" and instructing the Secretary-General "to study and submit to the Council at its fifteenth session a detailed estimate of the cost of preparing and equipping a laboratory ... large enough to handle the increased research work". The Council adopted this resolution without debate.

At the Council's request, the Secretariat prepared a draft resolution on the problem of the coca leaf embodying the Commission's recommendations on this matter. When this item was discussed, the Government of Bolivia, but not that of Peru, was represented; the representative of Bolivia reiterated his Government's support of the Commission's recommendations and its readiness to continue to suppress the illicit traffic in coca leaves and cocaine. With regard to the draft resolution, the representative of Argentina proposed that the Governments of Bolivia and Peru should not be *requested* to take the necessary steps or *urged* to take effective measures (the wording suggested by the Commission), but that the Council should employ the word *recommend* which was in accordance with Article 62 of the United Nations Charter. The Council adopted this amendment without a vote. The representative of Argentina also proposed deletion of the word *immediately* in the clause "recommends to the Governments of Bolivia and Peru to take the necessary steps to limit *immediately* the production of coca leaves to licit consumption and manufacture" (also the Commission's wording) on the ground that it gave the recommendation too peremptory a tone. This amendment was likewise adopted. The Council then adopted the resolution, as amended.

Before taking note of the report, the Council heard statements by the representatives of Pakistan and the Union of Soviet Socialist Republics. The representative of Pakistan urged amendment of paragraph 30 thereof pointing out that it referred to Jammu and Kashmir as if they were states of the Indian Union, despite the fact that the political status of those areas was still on the agenda of the Security Council. With regard to the Commission's query in paragraph 31 as to why the production of charas was prohibited in Pakistan while that of ganja and bhang was authorized, he pointed out that bhang was a species of Indian hemp which grew wild and the cultivation of which was not authorized; "ganja" was merely the name given to the young shoots of the bhang plant.

The representative of the Union of Soviet Socialist Republics proposed the deletion of paragraphs 56-59 from the report on the ground that they contained slanderous allegations against the People's Republic of China. He read a statement by the Ministry of Foreign Affairs of the People's Republic of China denying that the Republic was engaged in the illegal sale of heroin to Japan and asserting that a policy of strict prohibition of opium and other narcotic drugs was being "resolutely pursued". The representative of

the United States of America replied that the paragraphs in question merely reflected the debate which had taken place in the Commission and to delete them would amount to falsifying the record. The representatives of China and Czechoslovakia also spoke on the subject.

The Council took note of the report as approved by the Commission with the representatives of Czechoslovakia, Pakistan, Poland and the Union of Soviet Socialist Republics casting negative votes.

III

DATE AND PLACE OF THE EIGHTH SESSION OF THE COMMISSION ON NARCOTIC DRUGS

The Interim Committee on Programme of Conferences proposed to the Council two alternative periods for the eighth session of the Commission — 30 March to 24 April 1953 or 11 May to 5 June 1953. The Council decided upon the first of these alternatives, stipulating also that the session should be convened at Headquarters.

IV

REPORT OF THE PERMANENT CENTRAL OPIUM BOARD TO THE ECONOMIC AND SOCIAL COUNCIL ON STATISTICS OF NARCOTICS FOR 1950 AND THE WORK OF THE BOARD IN 1951

The Council heard statements by the representatives of India and Iran with respect to certain criticisms that the Board, in section III of its report, had directed towards some of the statistics furnished by the governments of those countries, as well as the rejoinders which Mr. May made in each instance on behalf of the Board.

The representatives of Belgium, France and the United States of America submitted a joint draft resolution noting the inadequacy of national controls over the production of opium and coca leaves and urging producing countries to take effective measures to control such production in order to prevent those substances from entering the illicit traffic. Those producing countries that had not already done so were also urged to report to the Board their full production, stocks and exports of opium and coca leaves for the year 1950. At the President's suggestion, the Council decided to add a preamble to this resolution taking formal note of the Board's report.

Certain representatives thought that the draft as it stood placed too much of the responsibility for the illicit traffic in narcotics on producing countries, especially in view of the fact that a large part of that traffic involved manufactured drugs. The delegations of Pakistan and the United States of America accordingly drew up an amendment to the draft resolution providing that producing countries should be urged to take effective measures to control the distribution as well as the production of opium and coca leaves and adding a new paragraph urging all governments to take additional steps to tighten their control over the import and distribution of those raw materials.

The Council adopted the entire resolution, as amended.

V

APPROVAL OF THE APPOINTMENT OF THE SECRETARY OF THE PERMANENT CENTRAL OPIUM BOARD

The Council approved unanimously the appointment of Mr. L. Atzenwiler as Secretary of the Permanent Central Opium Board. In taking this decision, the Council had before it a background memorandum prepared by the Secretariat.

VI

DATE OF ELECTION OF FIVE FIXED-TERM MEMBERS OF THE COMMISSION ON NARCOTIC DRUGS

The Council considered whether the term of office of the five members of the Commission — Egypt, Iran, Mexico, Netherlands and Poland — whom it had appointed for a three-year term on 5 August 1949 would expire on the eve of the first meeting of the Commission's eighth or ninth session, i.e., in 1953 or 1954. A background memorandum prepared by the Secretary-General was used as the basis for discussion.

Since the term of office of the five members mentioned above had not begun until 1 December 1950 (i.e., the first day of the first session of the Commission following this election) and since the specified length of the term was three years, the Council decided that the term should not expire until the eve of the ninth session of the Commission and accordingly postponed until next year the election of the five members.

VII

ELECTION OF MEMBERS OF THE PERMANENT CENTRAL OPIUM BOARD

The Council decided to appoint a working party to study the qualifications of the thirty-six candidates nominated by governments for membership on the Permanent Central Opium Board and to recommend for election sixteen of those candidates. The representatives of Belgium, Canada, Iran, Mexico, the Philippines and Sweden were appointed to be members of this group.

The Working Party, after studying the biographies of the candidates, submitted to the Council a report recommending sixteen nominees for appointment to the Board.

When the Council considered that report the representative of the United Kingdom, drawing attention to an expression of regret by the Working Party that some governments had not given sufficiently comprehensive information on the qualifications of their nominees, proposed that consideration of the item be deferred until the session was resumed at the end of the year and that meanwhile the Secretary-General

invite the governments concerned to furnish supplementary information as soon as possible. This proposal was submitted in the form of a draft resolution but was rejected.

Following this decision the Council proceeded directly to the election. During the course of four ballots, the following candidates were chosen to be members of the Permanent Central Opium Board: Messrs. F. Abou-Zahar (Lebanon), E. D. Espinosa (Philippines), H. Fisher (Switzerland), Sir H. Greenfield (United Kingdom), H. May (United States), M. E. Rehman (India), P. Reuter (France), and Sanchez (Chile).

VIII

Invitation to Libya to become a party to the Protocol of 19 November 1948 bringing under international control drugs outside the scope of the Convention of 13 July 1931 as amended by the Protocol of 11 December 1946

The Council examined a memorandum prepared by the Secretariat proposing that Libya be invited, in accordance with article 5 of the Protocol of 19 November 1948, to become a party to that treaty at an early date; the Council adopted unanimously a resolution to that effect.

IX

Communication to governments of findings of the World Health Organization under article 8 of the 1925 Convention, as amended by the Protocol of 11 December 1946

The Council examined a memorandum by the Secretariat which proposed that the Secretary-General should be empowered to act in behalf of the Council in transmitting to governments the findings made by the World Health Organization under article 8 of the 1925 Convention as amended, since the task was purely administrative in character. The Council agreed to the proposal and adopted the necessary enabling resolution.

Principal League of Nations Documents Relating to Narcotic Drugs

A list of the more important League of Nations documents relating to narcotic drugs is given in the following pages. These documents, of which no systematic compilation has been made until now, contain a variety of information, legal, technical, administrative and the like.

Documents that were merely ephemeral, those dealing with seizure reports, or internal administrative details, etc., have been omitted. The selection was made to help the research worker; in other respects it may not be above criticism. Since most of the documents do not belong to a strictly defined category, it was thought preferable to avoid multiple references which would make the list unwieldy.

It is hoped that, such as it is, this list will be of use. All documents, except where there is an indication to the contrary, are still existing, that is, they are not out of print and can be consulted either at the Permanent Headquarters of the United Nations, or at the United Nations Library in Geneva.

The documents are classified as follows:

I. Raw materials and derivatives
   - A. Opium and derivatives
   - B. Coca leaf and derivatives
   - C. Indian hemp and derivatives

II. Trade in narcotics
   - A. Legal trade
   - B. Illicit traffic

III. Control
   - A. National
   - B. International
   - C. Systematic account of the work of the international bodies dealing with narcotics

IV. Drug addiction

V. Miscellaneous

I. RAW MATERIALS AND DERIVATIVES

A. Opium and Derivatives

O.C.	33 and 33(a)	Reports on poppy plantation from the Chinese provincial governors.	
O.C.	44	Note on poppy cultivation in China proper and in the frontier territories and the smuggling of morphine into China, submitted by the Chinese Representative.	21 April 1922
O.C.	83	Notes on the opium trade in Chinese Turkistan and Central Asia by the British Consul General at Kashgar in Chinese Turkistan.	2 January 1923
O.C.	101	Statement on the manufacture of morphia, other opium derivatives and cocaine with statistical tables.	11 May 1923
O.C.	109	Memorandum by the Secretariat on world cultivation and production of opium.	
O.C.	113	Memorandum by the British Representative on the production of opium and its export from the Chinese province of Yunnan.	
O.C.	133	Approximate consumption of prepared opium and morphine equivalents per head of Chinese population in European and Japanese Colonies of the Far East and Siam for the year 1921.	29 May 1923
O.C.	136	Note by the Secretary on opium production in China. Telegram from Chinese Government to Chinese Representative.	30 May 1923
O.C.	156	Extract from an official report on the trade in opium of Chinese Turkestan for the period ending May 31st 1923. Forwarded by the British Government.	6 October 1923
O.C.	245	Letter from the British Government with regard to the cultivation of the opium poppy in Southern Serbia, and enclosing a copy of an article appearing in a Serbian newspaper.	8 January 1925

O.C.	247	Report on the cultivation of the poppy in Persia. Forwarded by the British Government.	22 January 1925
O.C.	425	Declaration of morphine content of opium, at the time of importation. Memorandum by the Secretariat.	21 May 1926
O.C.	474	Extracts from articles on "Public Health in Persia 1914-1924" by the Representative of the Persian Sanitary Council, published in the *Lancet*, on the opium question in Persia.	17 August 1926
O.C.	486(g)	Letter from Dr. Anselmino showing the movement of prices of Turkish opium during 1932.	26 January 1933
O.C.	524	Memorandum by Dr. Anselmino on morphine content of raw opium not intended for conversion into prepared opium.	10 January 1927
O.C.	548	Note circulated by the British Representative on various kinds of opium.	18 January 1927
O.C.	630	Letter from the Representative of Germany with regard to the question of eucodal and dicodide.	18 July 1927
O.C.	794	Communication by British Representative. Use of prepared opium in British Malaya.	
O.C.	885	Kabay, János. Process for obtaining opium alkaloids; memorandum.	7 December 1928
O.C.	1096	Memorandum by British Representative on different results reached by processes laid down in different pharmacopoeias for ascertaining percentage of morphine in opium.	13 December 1929
O.C.	1168	Opium cultivation in Siberia. Communicated by the Delegate of Japan.	12 February 1930
O.C.	1228	Statistics of the manufacture, imports, exports, consumption and stocks of morphine, diacetylmorphine and cocaine for the year 1929.	3 July 1930
O.C.	1309	Memorandum by Dr. Knaffl-Lenz regarding the methods of identifying morphine esters.	12 December 1930
O.C.	1323 and 1323(a)	*Notes verbales* from the Polish Government concerning the prohibition of the use of heroin in Poland.	5 January 1931 5 May 1931
O.C.	1389	Memorandum on the results of an investigation made in the British Government Laboratory into the methods of separating and distinguishing dicodide, eucodal and dilaudide.	8 June 1931
O.C.	1416	Different results obtained by the processes laid down in various pharmacopoeias for ascertaining the percentage of morphine in opium.	9 April 1932
O.C.	1421	Article on morphine esters and morphine ethers as narcotic drugs, by Prof. Hermann Emde, of Basle and Konigsberg: published in *Deutsche Medizinische Wochenschrift* no. 52 of 1931.	31 May 1932
O.C.	1451	"Chemistry of Opium Alkaloids", by Dr. Lyndon E. Small. Supplement No. 103 to the Public Health Reports of the United States Treasury Department (Communicated by the American Consulate, Geneva).	26 October 1932
O.C.	1477	Memorandum by the Secretariat on the question of codeine and dionine preparations under the Limitation Convention.	1 May 1933
O.C.	1498 and 1498(a)	Enquiry into the use and composition of heroin pills.	27 September 1933 26 October 1933
O.C.	1506(a)	Analysis of opium manufactured and sold for smoking purposes by the Persian Government opium monopoly.	2 November 1933
O.C.	1512 and 1512(b) series 1512(c)	Different results reached by the processes laid down in the different pharmacopoeias for ascertaining the percentage of morphine in opium.	6 November 1933 22 October 1935 18 November 1935
O.C.	1512(d)	Standardisation of methods for determining the morphine content of raw opium and the cocaine content of coca leaves: communicating doc. CH. 1224.	22 February 1937
O.C.	1512(e)	Standardisation of methods for determining the morphine content of raw opium and the cocaine content of coca leaves.	2 June 1938
O.C.	1512(f)	Question of the determination of the morphine content of raw opium and the cocaine content of coca leaves.	20 June 1938
O.C.	1512(g)	Question of the determination of the morphine content of raw opium and the cocaine content of coca leaves.	15 May 1939
O.C.	1541	Cultivation and trade of opium in China: situation in the province of Hupeh.	15 May 1934

O.C.	1546 series	Process employed by the "Alkaloida" Co. Ltd. factory at Büdszentmihaly (Hungary) to extract morphine and other opium alkaloids direct from the dry poppy plant (poppy straw).	22 May 1934 19 November 1934
O.C.	1546(1) (d)	Extraction of morphine and other alkaloids of opium direct from the dried poppy plant. Analysis of opium poppies grown in Denmark.	6 May 1936
O.C.	1546(1) (e)	Analytical determination of the alkaloids contained in the dried opium — poppy plant. Scientific research undertaken in the Union of Soviet Socialist Republics.	17 April 1937
O.C.	1546(1) (f)	Analysis of poppies grown in Denmark.	24 April 1937
O.C.	1546(1) (g)	Process employed by the "Polska Spolka Wytworow Chemicznych Roche S. A.", Warsaw (Poland) for the extraction of morphine and codeine direct from dried poppy capsules (poppy heads).	9 June 1937
O.C.	1546(1) (h)	An account of the János von Kabay method of determining the morphine content of poppy straw. Communicated by the Hungarian Government.	6 February 1939
O.C.	1589	Question of the abolition or restriction of the use of diacetylmorphine.	26 April 1935
O.C. and addendum	1589(1)	Question of the abolition or restriction of the use of diacetylmorphine.	23 April 1936 22 May 1936
O.C.	1610	Recommendation regarding codeine preparation.	3 June 1935
O.C.	1616	Dilaudide (dihydromorphinone): a review of the literature and a study of its addictive properties. Supplement No. 113 to the Public Health Reports.	22 November 1935
O.C.	1633 and 1633(a)	Experiments in opium poppy growing in Denmark and morphine content of Danish opium.	6 May 1936 9 March 1937
O.C.	1681	Control exercised in Hungary over methylmorphine (codeine) and ethylmorphine (dionine).	3 May 1937
O.C.	1688	Desomorphine as a habit-forming drug.	17 May 1937
O.C.	1691	Extension to paracodine of the provisions of the Convention of 1931 for limiting the manufacture and regulating the distribution of narcotic drugs.	19 May 1937
O.C.	1727	Application in Hungary of article 10 of the 1931 Limitation Convention regarding diacetylmorphine.	12 May 1938
O.C.	1743	Note by the Secretariat on diacetylmorphine (heroin).	15 June 1938
O.C.	1764	Conference for the adoption of a protocol to extend to dihydrocodeine and its salts certain provisions of the Convention for limiting the manufacture and regulating the distribution of narcotic drugs of 13 July 1931.	12 May 1939
O.C.	1766	Addition liability of certain drugs; study of pharmacological properties of eucodal, dicodide, dilaudide and acedicone.	16 May 1939
O.C.	1774	Note on the manufacture and consumption of prepared opium in Peru.	6 June 1939

B. Coca Leaf and Derivatives

O.C.	64	Memoranda by the British Representative on "artificial cocaine" and on the exchange of information with regard to seizures.	
O.C.	81	Reply from the Government of Japan with regard to the traffic in cocaine.	26 December 1922
O.C.	82	Reply from the Government of Switzerland with regard to the traffic in cocaine.	22 December 1922
O.C.	82(a)	Further letter from the Government of Switzerland with regard to the traffic in cocaine.	3 January 1923
O.C.	148	Reply of the Polish Government with reference to the manufacture and consumption of cocaine.	2 August 1923
O.C.	153	Letter from the Peruvian Government with reference to the export of coca leaves and cocaine.	12 July 1923
O.C.	158	Letter from the Bolivian Government with regard to the coca industry and the preparation of cocaine.	28 August 1923

O.C.	215	Note by the Representative of Germany on psicain as a cocaine substitute.	6 August 1924
O.C.	381	Communique from the Government of India with regard to the alleged cultivation of the coca plant in India.	10 March 1926
O.C.	445	Articles of the Coca Producers' Association. Communicated by the Netherlands Representative.	28 May 1926
O.C.	446	Notes relative to an Association of Cocaine manufacturers. Letter from the German Representative (with erratum).	12 May 1926
O.C.	553	Export of coca leaves from Bolivia during three years to 1925. Additional figures communicated by the British Representative.	23 January 1927
O.C.	861	Letter from Dr. Anselmino to Sir Malcolm Delevingne regarding methyl-ecgonin.	28 September 1928
O.C.	990(c)	Manufacture of "Egocain" by the firm of Leon Egger, Budapest.	12 December 1932
O.C.	1228	Statistics of the manufacture, imports, exports, consumption and stocks of morphine, diacetylmorphine and cocaine for the year 1929.	3 July 1930
O.C.	1512(d)	Standardisation of methods for determining the morphine content of raw opium and the cocaine content of coca leaves: communicating doc. C.H. 1224.	22 February 1937
O.C.	1512(e)	Standardisation of methods for determining the morphine content of raw opium and the cocaine content of coca leaves.	2 June 1938
O.C.	1512(f)	Question of the determination of the morphine content of raw opium and the cocaine content of coca leaves.	20 June 1938
O.C.	1512(g)	Question of the determination of the morphine content of raw opium and the cocaine content of coca leaves.	15 May 1939
O.C.	1629	Growing of coca plants for ornamental purposes at Tawau, British North Borneo.	5 May 1936

C. Indian Hemp and Derivatives

O.C.	163	Letter from the Government of the Union of South Africa, regarding Indian hemp.	28 November 1923
O.C.	291	Note by the Secretary of the Advisory Committee on the replies of governments with regard to the proposal of the Government of South Africa to treat Indian hemp as a habit-forming drug.	17 August 1925
O.C.	315	Statement by the Siamese Government with regard to its attitude with reference to Indian hemp.	26 August 1925
O.C.	1094	Cultivation of Indian hemp for the manufacture of hashish. Communications from the Egyptian and French Governments.	10 December 1929
O.C. (C.H. 1127)	1503	20th Session of the Health Committee. Application of article 10 of the Opium Convention of 1925 to certain preparations of Indian hemp.	27 October 1933
O.C.	1542 series	Preliminary note on the chief aspects of the problem of Indian hemp and the laws relating thereto in force in certain countries.	23 May 1934 16 January 1936
O.C.	1542(j)	Questionnaire prepared for the use of the experts who have been invited by the Advisory Committee to collaborate with it on this subject. [on Indian hemp]	16 January 1936
O.C.	1542(j) (a)	Sub-Committee on Cannabis. Do hemp stalks used commercially for fibre contain resin?	27 May 1938
O.C.	1542(k)	Situation as regards the control of cannabis (hemp) and drugs derived from cannabis.	15 May 1936
O.C.	1542(l)	Note on cannabis: Extract from a letter dated 6 April 1936 from Dr. Bouquet to M. de Myttenaere.	19 May 1936
O.C.	1542(m)	Second note on Indian hemp: by Dr. de Myttenaere.	23 May 1936
O.C.	1542(n)	Situation concerning the control of cannabis (hemp) and of drugs derived from cannabis.	27 May 1936
O.C.	1542(o)	Note by Dr. Bouquet concerning document O.C. 1542(j). Questionnaire on Indian hemp.	10 February 1937

O.C. 1542(o) Addendum	Supplement to the previous document by Dr. Bouquet.	17 May 1937
O.C. 1542(p)	Memorandum on cannabis sativa detection, etc. by Dr. James C. Munch.	15 March 1937
O.C. 1542(q)	Excerpts from a report prepared in the Treasury Department of the United States of America concerning cannabis and from the decennial revision of the United States pharmacopoeia in regard to cannabis.	24 March 1937
O.C. 1542(r)	Memorandum by Dr. W. L. Treadway, Assistant Surgeon-General (USA) dealing with cannabis, with special reference to the questionnaire submitted to the cannabis experts (document O.C. 1542(j)).	23 March 1937
O.C. 1542(s)	Memorandum describing a simple test for determining the presence of marihuana in cigarettes.	18 May 1937
O.C. 1542(t)	Third note on Indian hemp by Dr. de Myttenaere, Assessor.	25 May 1937
O.C. 1542(t) Addendum	Sub-Committee on cannabis. Supplement to the third note on Indian hemp.	14 September 1937
O.C. 1542(w)	"Marihuana Tax Act of 1937", promulgated by the Congress of the United States of America and approved by the President, 2 August 1937.	15 September 1937
O.C. 1542(x) and addendum	Study of the chemical identification of marihuana (cannabis indica), by Rafael Plasencia, Government Chemist in the Republic of Cuba.	4 October 1937 and 10 May 1938
O.C. 1542(y)	Further information concerning the "Marihuana Tax Act of 1937".	22 November 1937
O.C. 1542(z)	Information regarding experiments on the chemical identification of marihuana.	3 March 1938
O.C. 1607	Sub-Committee on cannabis sativa. 1st Session. Report submitted to the Advisory Committee.	31 May 1935
O.C. 1655	Report of the Sub-Committee on Indian hemp on the work of its second session.	30 May 1936
O.C. 1707	Sub-Committee on Cannabis. 3rd Session (2, 7 and 9 June 1937).	9 June 1937
O.C. 1724	Report by Dr. J. Bouquet, Inspector of Pharmacies, Tunis, Pharmacist of Tunis Hospitals.	31 March 1938
O.C. 1724 Addendum and corrigenda	Supplement to O.C. 1724 by Dr. Bouquet *4 June 1938*. Corrigenda, 24 January 1939.	
O.C. 1724(a) and addendum	Fourth note on Indian hemp, by Dr. de Myttenaere, Assessor. *31 March 1938*. Supplement to O.C. 1724(a).	
O.C. 1724 Second addendum	Second supplement to O.C. 1724 by Dr. Bouquet.	3 June 1938
O.C. 1724(a)	Second supplement to O.C. 1724(a) by Dr. de Myttenaere.	11 June 1938
O.C. 1731	Situation concerning the control of cannabis (hemp) and of drugs derived from cannabis (USA).	14 May 1938
O.C. 1733	Further information concerning marihuana (USA).	14 May 1938
O.C. 1763(1)	Sub-Committee on cannabis. 5th Session. Draft report submitted by Mr. Nind, Representative of India.	12 May 1939 15 May 1939
O.C./Cannabis/1	Situation concerning control of cannabis (hemp) and of drugs derived from cannabis. Treatise by the United States Treasury Department on marihuana identification.	28 November 1938
O.C./Cannabis/2	Sub-Committee on cannabis. Method of identifying cannabis. Duquenois and Hassan Negm Reaction.	24 January 1939
O.C./Cannabis/3	Present state of documentation concerning cannabis and the problems to which it gives rise. Report presented by Dr. J. Bouquet, Inspector of Pharmacies, Tunis, Pharmacist to the Tunis Hospitals.	12 April 1939
O.C./Cannabis/4	Enquiry regarding the determination of the resin content of Indian hemp grown in different countries.	14 April 1939
O.C./Cannabis/5	Review of progress on the marihuana investigation during the year 1938, in the USA.	19 April 1939
O.C./Cannabis/6	Fifth note on cannabis by Dr. F. de Myttenaere, Assessor.	26 April 1939
O.C./Cannabis/7	Present position in regard to cannabis; results obtained and problems to be solved.	22 April 1939

O.C./Cannabis/8	Cannabis addiction in Turkey. Physiological and psychological effects of intoxication.	27 April 1939
O.C./Cannabis/9	The active principles of cannabis indica resin I. by Thomas Spense Work, Franz Bergel and Alexander Robertus Todd, from the Biochemical Department, Lister Institute, London.	2 May 1939
O.C./Cannabis/10	Chronic cannabis intoxication. Draft questionnaire submitted by Professor A. Porot and Dr. J. Bouquet.	4 May 1939
O.C./Cannabis/11	Aberrant variety of cannabis (results of the second year of cultivation).	1 May 1939
O.C./Cannabis/12	Cannabis addiction in Algeria, considered in its relationship to mental pathology and criminality.	8 May 1939

II. TRADE IN NARCOTICS

A. Legal Trade

O.C.	115	Summary of replies received from governments with regard to the annual requirements of opium and its derivatives for internal consumption.	
O.C.	118	Statement of exports of Indian opium from Calcutta during 1922.	
O.C.	193	Memorandum prepared by the Secretariat giving a summary of the replies received from governments in connexion with the traffic in free ports, free zones and bonded warehouses.	
O.C.	368	Memorandum by the British Government on the insurance of consignments of opium and other dangerous drugs.	17 February 1926
O.C.	375	Letter from the Representative of Germany with regard to duplicate export certificates.	6 January 1926
O.C.	392	Classified list of conditions governing import, export of narcotics in all the countries of the world. Communicated by the German Representative.	13 April 1926
O.C.	392(1)	Revised copy of classified list of conditions governing import, export of narcotics in all the countries of the world (with erratum).	
O.C.	386	Letter from the Netherlands Government with regard to free ports and free zones in the Netherlands overseas territories.	12 March 1926
O.C.	486	Letter from the German Representative enclosing graphs showing the prices of raw opium.	28 August 1926
O.C.	486(e)	Letter from Dr. Anselmino showing the movement of prices of the Turkish opium during 1930.	21 January 1931
O.C.	486(f)	Ditto during 1931 (letter from Dr. Anselmino showing the movement of prices of the Turkish opium during 1931).	2 February 1932
O.C.	513	Maritime insurance clause. (No. VIII of resolutions adopted by Opium Advisory Committee at its 8th Session.) Note communicated by the British Representative.	23 December 1926
O.C.	513(a)	Maritime insurance. Letter from the British Representative concerning action taken by the German Marine Underwriters' Association.	3 January 1927
O.C.	537	Summary of replies received concerning free ports and free zones.	15 January 1927
O.C.	545	The control of the conveyance of Persian opium by the Japanese ships chartered by foreign nationals, communicated by the Japanese Representative.	17 January 1927
O.C.	550	Letter from the Swiss Government on the supervision of the exportation of narcotics to countries in which the system of licences is not in force.	19 January 1927
O.C.	554	Draft resolution re reduction of amount of manufactured drugs produced. presented by the Italian Representative.	25 January 1927
O.C.	555	Letter from the Swiss Government communicating certain observations regarding the 9th resolution adopted by the Committee at its 8th Session, and approved by the Assembly (sending drugs through the post).	25 January 1927
O.C.	557 and erratum	Comparative tables of exports and imports.	26 January 1927
O.C.	572	Morphine factory in Turkey. Letter from the German Representative.	2 March 1927
O.C.	596	Letter from the Netherlands Government re maritime insurance.	21 April 1927

O.C.	646	Note from the Swedish Government with regard to free ports in that country.	24 August 1927
O.C.	666	Memorandum by the Italian Representative on import certificate system and national control of factories.	26 September 1927
O.C.	666(1)		
O.C.	677	Maritime insurance. Letter from the Representative of the United States of America.	
O.C.	731	Rumania. Letter with regard to free ports and free zones. Geneva, 1928.	26 March 1928
O.C.	761	Comparative tables of exports and imports.	19 April 1928
O.C.	764	Table showing imports of Persian raw opium given by various countries in annual reports for 1926.	16 April 1928
O.C.	772	Figures of manufacture of morphine and salts of morphine.	19 April 1928
O.C.	909 and addendum	Regulations in free ports and free zones concerning the control of the traffic in opium and other dangerous drugs.	18 January 1929
O.C.	910	Trade statistics of drugs in transit, and the question of a uniform method for the presentation of such statistics.	15 January 1929
O.C.	1001	Letter from Hungarian delegation with regard to a new drug factory in Hungary.	25 July 1929
O.C.	1001(a)	Particulars re operation of Hungarian drug factory ("Alcalada" S.A. in Büdszentmihaly).	9 August 1929
O.C.	1109 (Confidential)	Statistics of the manufacture of narcotic drugs. Report prepared by Dr. Anselmino at the request of the Secretariat.	
O.C.	1109(a)	Statistics of manufacture of narcotic drugs. Letter from Sir John Campbell concerning the report by Dr. Anselmino.	16 January 1930
O.C.	1109(b)	Statistics of the manufacture of narcotic drugs. Annex to report prepared by Dr. Anselmino.	8 February 1930
O.C.	1112	World consumption of opiates and cocaine. Document prepared by the Health Section.	December 1929
O.C.	1112(a)	Statistics of manufacture, imports, exports, consumption and stocks for the year 1929, and of estimates for the year 1930	8 August 1930
O.C.	1112(a) Addendum	Statistics of manufacture, imports, exports, consumption and stocks for the year 1929, and of estimates for the year 1930.	7 October 1930
O.C.	1143	List of factories authorised to manufacture drugs covered by the Geneva Opium Convention, chapter III.	17 January 1930
O.C.	1229	New list of Polish firms authorised to manufacture narcotic drugs.	5 July 1930
O.C.	1231	List of French firms authorised to manufacture narcotic drugs.	16 July 1930
O.C.	1351	Re-export trade of the non-manufacturing countries in morphine, diacetylmorphine and cocaine.	19 January 1931
O.C.	1360	Prices of raw opium, coca leaves, morphine hydrochloride, diacetylmorphine hydrochloride, codeine phosphate and cocaine hydrochloride during the period 1928-1930.	26 January 1931
O.C.	1387	Alleged interests of certain German drug manufacturers in Turkish drug factories.	20 April 1931
O.C.	1387(a)	Alleged interests of a Swiss drug factory in a Turkish drug factory. Letter from the Swiss Federal Political Department.	5 May 1931
O.C.	1396	Establishment of a new drug factory in Warsaw, Poland — La Société Polonaise des Produits chimiques "Roche".	19 February 1932
O.C.	1404	Chartering of vessels by foreigners. — Letter from the Acting Director of the Communications and Transit Section of the Secretariat.	31 March 1932
O.C.	1442	Synoptical statistical tables showing the manufacture of morphine, diacetyl morphine and cocaine in the principal manufacturing countries during the period 1926-1930.	3 May 1932
O.C.	1454	Import certificate for a consignment of 1,700 cases of opium from Persia to Vladivostok in October 1931.	29 November 1932
O.C.	1463 (Confidential)	Manufacture in Germany in 1931 of drugs not falling under the Geneva (1925) Opium Convention.	25 January 1933
O.C.	S.105	Drugs factories established in Bulgaria.	8 March 1933 1 May 1933
O.C.	1485	Communicating document Conf. D. 159. Analogies between the problem of the traffic in narcotic drugs and that of the trade in and manufacture of arms.	12 May 1933

O.C.	1486 (Confidential)	Agreement between Turkey and Yugoslavia concerning the exportation of opium.	16 May 1933
O.C.	1487 and 1487(a)	Study of the methods used in the compilation of consumption statistics.	22 May 1933 27 March 1934
O.C.	1516	Opium Convention, concluded on 28 December 1932, between the Government of the French Settlements in India and the Government of India, for the purpose, *inter alia*, of preventing the introduction of contraband opium in Chandernagore.	15 November 1933
O.C.	1554	Statistical survey of the present position as regards the world's legitimate trade in raw opium.	26 May 1934
O.C.	1603	Application of article 20 of the Limitation Convention — The drawing up of a factory list for circulation to governments.	24 May 1935
O.C.	1628	Table showing the total volume of the export trade in methylmorphine (codeine) and ethylmorphine (dionine), during the year 1934 and quantities of these drugs held in stock at the end of that year.	5 May 1936
O.C.	1663	Manufacture of drugs in Turkey.	24 August 1936
O.C.	1664	Convention between British India and the French Settlements in India regarding the conversion into an annual payment of 3,000 rupees of the rights in connexion with the opium trade reserved to the French Government by article 6 of the Convention of 7 March 1815, and for the purpose of preventing the introduction of contraband opium in Chandernagore; signed at Chinsurah, 4 January 1936.	9 October 1936
O.C.	1694	General survey of the situation in regard to the world manufacture and use of and trade in the principal drugs licitly manufactured during the period 1931-1935.	20 May 1937
O.C.	1699 - 1699(a) and (b)	Question of supply of narcotic drugs to foreign ships in ports of another country.	25 May 1937 3 June 1938 11 May 1939

B. Illicit Traffic

O.C.	6(c)	Final approved text of questionnaire (draft questionnaire on the traffic in opium).	2 May 1921
O.C.	22	Review of the situation with regard to the traffic in opium and other dangerous drugs.	13 April 1922
O.C.	49	Summary of replies to the opium questionnaire of 1921 (with annex) (draft questionnaire on the traffic in opium).	1 April 1922
O.C.	61	Report of seizures of cocaine in the various provinces of India.	29 August 1922
O.C.	79	Report on the drawing up of a black list.	22 December 1922
O.C.	84	Estimated amount of annual traffic in Persian and Turkish opium.	5 January 1923
O.C.	225	Report of the British Government on the traffic in opium.	
O.C.	276	Operations of a syndicate for importing opium and narcotics. Case of the *Kumagata Maru*. Information forwarded by the British Government, together with a letter from the Italian Government.	
O.C.	276(a)	Operations of a syndicate for importing opium and narcotics. Letter from the Japanese Government.	
O.C.	294	List of seizures reported to the Secretariat since 1921. Prepared by the Secretariat.	22 August 1925
O.C.	294(a)	List of seizures reported to the League of Nations since August 1925.	22 April 1926.
O.C.	295	Memorandum by the representative of Germany on the falsification of labels.	14 August 1925
O.C.	296	Memorandum by the Secretariat on the treaty between Canada and the United States of America for the suppression of smuggling operations.	6 August 1925
O.C.	341(a)	Extract from a letter from the International Anti-Opium Association with regard to the import of strychnine and caffein pills into China.	

O.C.	416(1)	Letter from the German Consul-General at Geneva concerning forged labels on packets containing narcotics.	9 December 1925
O.C.	420	Memorandum on smuggling at Dairen. Communicated by the British Representative.	21 May 1926
O.C.	444	Extracts from a letter from the Department of Agriculture, Excise and Forests, Government of Burma with regard to the more effective prevention of smuggling into the Shan States and from thence into Burma and from the Shan States into foreign territory. Communicated by the Indian Representative.	27 May 1926
O.C.	453(a)	Enforcement of the Internal Revenue Narcotic Laws for the period of 1 July 1921 to 31 December inclusive by divisions, with general statistics beginning 1 July 1915.	16 July 1926
O.C.	500	Letter from International Mercantile Marine Officers' Association, concerning the question of contraband in vessels.	29 November 1926
O.C.	502	Report on opium traffic in Chinese Turkestan during 1925, forwarded by the British Government.	29 November 1926
O.C.	622	Smuggling into Iraq by the cross-desert motor route from Syria. Note by the British Representative.	4 July 1927
O.C.	638 and erratum	Memorandum by Dr. Anselmino on the formation of an international syndicate of drug manufacturers.	9 August 1927
O.C.	660	Information on the movements of individuals engaged in the illicit international traffic in drugs, forwarded by the Netherlands Government (Hoornstra case).	15 September 1927
O.C.	656(b)	Letter from the British Government with regard to the Henri de Monfreid case.	1 October 1928
O.C.	656(c)	Letter from the British Government with regard to the Henri de Monfreid case.	15 November 1928
O.C.	710(a)	Illicit traffic in heroin. Note by Mr. Caldwell (previous document O.C. 710).	30 April 1929
O.C.	715	List of traffickers in narcotic drugs. Communicated by Dr. Carrière.	28 January 1928
O.C.	719	Traffic in opium and other dangerous drugs; use of the post by illicit traffickers. Letter from the Swiss Government and copy of circular sent by that Government to the International Bureau of the Universal Postal Union. Geneva, 1928.	11 February 1928
O.C.	739	Case of heroin smuggling in Palestine (case of Bruno Löw).	27 March 1928
O.C.	742	Note by the Secretariat on various marks on drugs seized in the Netherlands East Indies.	28 March 1928
O.C.	791	Note by M. Bourgois on difficulties in regard to the control of the illicit traffic in drugs through the post.	23 April 1928
O.C.	862	Seizure of heroin pills at Hong Kong. Report communicated by the British Government.	3 October 1928
O.C.	916	Note by the Swiss Delegate on the measures to be taken for preventing the smuggling of narcotics by letter post.	16 January 1929
O.C.	1118	Report on the activities of an international band engaged in illicit traffic in drugs between certain European countries and Egypt.	17 December 1929
O.C.	1125	Dangerous drug factories in Turkey. Note forwarded by the British Representative.	16 January 1930
O.C.	1140	Exports of Persian raw opium to Far Eastern countries compared with imports and transhipments as indicated in the annual reports of the governments concerned for the year 1928.	21 January 1930
O.C.	1199(b)	Further information with regard to seizures of peronine at Harbin during the December quarter 1929. Communicated by Mr. Lyall.	5 December 1930
O.C.	1246	Report on the manner in which the illicit traffic in opium from Marseilles and Hamburg to Rotterdam seems to be carried out. Communicated by the Netherlands Government.	2 August 1930
O.C.	1319(a)	Enquiry into the matter of forged labels. Replies from the Governments of the Netherlands, Portugal, Siam and Switzerland.	23 January 1931
O.C.	1335	Resolution regarding the illicit traffic passed on the 3rd International Police Congress at Antwerp, 25-30 September 1930.	10 January 1931
O.C.	1359 (Confidential)	Document regarding "black list" of drug traffickers, by Mr. A. H. Sirks.	27 January 1931

O.C.	1371	"Black list" and co-operation with police authorities. Statement by Mr. A. H. Sirks.	2 February 1931
O.C.	1415 (Confidential)	Part played in the illicit traffic by forwarding agents.	11 April 1932
O.C.	1417 (Confidential)	Memorandum re the establishment by the Secretariat of a "black list" of illicit traffickers in narcotic drugs: purposes, form and use of the "black list".	9 April 1932
O.C.	S.48	Report on investigations re organised bands of traffickers of cocaine from Japan to India.	13 April 1932
O.C.	S.61 (Confidential)	Information regarding the use in the illicit traffic of narcotic substances particularly ethylmorphine not controlled by national legislation.	29 June 1932
O.C.	S.82	Report on the discovery of a clandestine manufacture of drugs near Dairen.	1 December 1932
O.C.	S.114	Activities of the Eliopoulos-Del Gratio gang of traffickers.	11 May 1933
O.C.	1525	Export of 4 kg. 500 gr. of diacetylmorphine from Switzerland to Uruguay without an export authorisation.	7 February 1934
O.C.	S.205 to 205(e) series	Report by the Shanghai municipal police regarding clandestine drug factories, the manufacture of narcotic drug pills and the prevalence of the practice of pills-smoking in the Shanghai International Settlement.	17 October 1934 to 14 November 1935
O.C.	1588	Memorandum on the question of illicit traffic by aircraft.	26 April 1935
O.C.	1590	Smuggling by international sleeping cars and dining cars.	29 April 1935
O.C.	1593	Statistics of imports and exports of acid acetic anhydride.	11 May 1935
O.C.	1593(a)	Statistics of import and export of acid acetic anhydride.	15 May 1936
O.C.	1593(b)	Enquiry in regard to the manufacture and uses of acid acetic anhydride.	19 May 1937
O.C.	1593(c)	Statistics relating to imports and exports of acid acetic anhydride and caffeine.	3 June 1938
O.C.	1626	Passports of drug traffickers. Replies of governments to circular letter C.L. 37.1935.XI, of 7 March 1935.	29 April 1936
O.C.	1630 and 1630(1)	Postal traffic in drugs.	4 May 1936 10 November 1936
O.C.	1653	Report of the Sub-Committee instructed to make a study of the question of the adulteration of narcotic drugs.	27 May 1936
O.C.	1675(a)	Forgery of drug prescriptions.	7 June 1937
O.C.	1675		30 July 1937
O.C.	1687	Statistics relating to the import of caffeine into countries or territories in which heroin pills are manufactured or seized.	11 May 1937
O.C.	1690	Drugging of race horses. Memorandum communicated by the representative of the United States of America.	13 May 1937
O.C.	1714 and 1714(a)	Illicit traffic in narcotic drugs by aircraft. Consultation of the International Air Navigation Commission.	17 December 1937 17 May 1938
O.C.	1750	Situation as regards the illicit traffic in Spain.	9 December 1938
O.C.	1762	Chartering of ships for the illicit traffic.	3 May 1939

III. CONTROL

A. National

O.C.	50	Decree of Persian Government with regard to the import and use of morphine, cocaine, etc.	22 May 1922
O.C.	72	Correspondence with the Chinese Representative with reference to the proposed Chinese drug factory and control bureau.	27 November 1922
O.C.	99(h)	The International Anti-Opium Association regarding the suppression of opium in China.	
O.C.	99(i)	The London Missionary Society, regarding the opium cultivation and the traffic in opium and morphine in China.	
O.C.	102	Statement from the Japanese Government with regard to the control of the traffic in drugs in Manchuria and Tsing-Tao.	20 March 1923
O.C.	202	Extracts from the reports of the Administrator General of Finance in Persia.	31 July 1924
O.C.	206	Letter from the Swiss Representative concerning statistics of the manufacture of cocaine in Switzerland and of the import of dangerous drugs.	19 July 1924

O.C.	207	Measures adopted in India to give effect to the provisions of the Hague Opium Convention. Summary of the progress made in connexion with the adoption by Indian states of measures necessary to give effect to the provisions of this Convention.	4 August 1924
O.C.	210	Letter from the Japanese Government with regard to the suppression of the manufacture of heroin.	
O.C.	224	Memorandum from the British Government with regard to opium cultivation in various parts of China during the first quarter of 1924.	
O.C.	226	Memorandum on the situation in Persia with regard to opium. Forwarded by the British Government.	16 September 1924
O.C.	244	Letter from the British Government enclosing a memorandum with regard to the control of narcotics in Soviet Russia.	
O.C.	246	Memorandum forwarded by the British Government with regard to the cultivation and traffic in opium in the province of Yunnan, China.	
O.C.	259	Memorandum regarding the opium situation at Swatow. Forwarded by the British Government.	30 April 1925
O.C.	277	Note with regard to the opium situation in the province of Szechuan, China. Forwarded by the British Government.	25 June 1925
O.C.	312	The policy of the Japanese Government on the control of the opium traffic. Memorandum by the Japanese Representative.	25 August 1925
O.C.	313	Reply by the Japanese Representative to the questions raised by the British Representative regarding the supplementary information for Chosen and for Japan proper as to the figures for the raw opium which is used to manufacture morphine and salts of morphine.	26 August 1925
O.C.	316	Statement by the French Representative on the regulations for the traffic in and manufacture of narcotics in Syria.	26 August 1925
O.C.	343	Summary of the progress made in connexion with the adoption by Indian states of measures to strengthen their laws and regulations in regard to opium. Forwarded by the Indian Office, London.	19 November 1925
O.C.	348	Letter from the British Representative with regard to the application of the import certificate system in the British Mandated Territories.	12 November 1925
O.C.	428	Memorandum with regard to the amount of raw opium used in Japan in manufacturing morphine and the amount of the drug produced. Communicated by the Japanese Representative.	25 May 1926
O.C.	436	Extracts from the reports of the Excise Administrations of the Punjab, Bombay Presidency and Bengal for the financial year 1924-25 on cocaine smuggling in India. Communicated by the Indian Representative.	26 May 1926
O.C.	450	Statement by Colonel Arthur Woods on the enforcement of the provisions controlling the drug traffic in the United States of America.	31 May 1926
O.C.	452	Letter from Mrs. Hamilton Wright with regard to the situation in the Philippine Islands.	24 May 1926
O.C.	467	Extracts from the report by the British Municipal Council of Hankow for the year 1925, showing the opium seized during the last ten years.	29 July 1926
O.C.	475	Summary of the progress made in connexion with the adoption by Indian states of measures necessary to give effect to the provisions of the International Opium Convention.	24 August 1926
O.C.	475(a)	Summary of the progress made in connexion with the adoption by Indian states of measures necessary to give effect to the provisions of the International Opium Convention. Report by the Indian Government.	24 June 1927
O.C.	478	Letter from the Greek Chargé d'Affaires in Berne with regard to the import, export and transit of opium and other drugs in Greece.	17 August 1926
O.C.	490	Extract from the Moscow *Izvestia* containing a decree of the Central Executive Committee and the Soviet of People's Commissars of USSR regarding the state of monopoly of opium.	19 October 1926
O.C.	496	Extracts from a report showing the extent of the traffic in Yunnan raw opium from Tunghing.	29 November 1926

O.C.	475(b)	Summary of progress made in connexion with the adoption by Indian states of measures to give effect to provisions of the International Opium Convention. Communicated by the India Office, London.	13 August 1928
O.C.	534	Extract from the report of the Cairo city police for the year 1925, circulated at the request of the British Representative.	14 January 1927
O.C.	543	The measures taken by the Japanese Government prohibiting the export of opium and other dangerous drugs from Japan into China and her adjacent countries. Statement by the Japanese Representative.	17 January 1927
O.C.	544	The new regulations on the import certificate for opium and other dangerous drugs, communicated by the Japanese Representative.	17 January 1927
O.C.	547	Extracts from the report on the Administration of the Excise Department in Bengal for the year 1925-1926, communicated by the Representative of India.	18 January 1927
O.C.	563	Extract from a report presented to the International Police Congress (Berlin, 1926) by Dr. Schlensbusch, Head of the Local Government, Hamburg, with resolutions, transmitted by Dr. Anselmino.	28 January 1927
O.C.	606	Decree published by the Portuguese Government relative to the illicit traffic, communicated by the Portuguese Government.	21 May 1927
O.C.	619	Royal Decree promulgated by the Spanish Government concerning the registration of drug addicts in Spain.	26 June 1927
O.C.	625(d)	Letter from Colonel Woods, assessor to the Advisory Committee, with regard to the enforcement of the federal narcotic laws in the United States of America.	14 November 1928
O.C.	650	Letter from the Argentine Government, enclosing copies of laws in force in Argentine, concerning illicit traffic.	7 September 1927
O.C.	653	List of laws relating to the traffic in opium received by the Secretariat from governments.	29 August 1927
O.C.	653(a)	List of laws relating to the traffic in opium, received by the Secretariat of the League of Nations since 29 August 1927.	28 April 1928
O.C.	661	Reduction of opium cultivation in Persia: bill for the abolition of land taxation and substitution of new taxation submitted to the Majlis on 26 June 1927.	17 September 1927
O.C.	670	Statistics regarding opium in Indian states for the years 1924-25, 1925-26 and 1926-27. Communicated by the Representative of India.	28 September 1927
O.C.	709	United States regulations concerning the transport of narcotic drugs in postal packets. Geneva, 1928.	24 January 1928
O.C.	716	Conditions under which drugs can be imported into China; letter from Mr. Lyall, assessor. Geneva, 1928.	28 January 1928
O.C.	723	Laws in force in Nicaragua restricting and regulating the import and sale of poisonous substances.	13 February 1928
O.C.	729 and 729(1)	Narcotic control in Spain.	17 March 1928
O.C.	740	Letter from the Venezuelan Government enclosing a law regulating the drug traffic in Geneva, 1928.	28 March 1928
O.C.	754	Mexico: Statistical information and laws and regulations in force in Mexico (concerning the substances mentioned in the Opium Convention).	12 April 1928
O.C.	756 and erratum	Netherlands: Letter concerning the adoption of the export certificate system.	April 1928
O.C.	774	Drug control in Germany (Cavazzoni Sub-Committee). Letter from the German Representative.	31 January 1928
O.C.	776	Drug control in Great Britain (Cavazzoni Sub-Committee).	April 1928
O.C.	777 and annex	Drug control in France (Cavazzoni Sub-Committee). (Note by M. Bourgois, member of the Sub-Committee).	January-February 1928
O.C.	778	Memorandum on the control of opium and the narcotic drugs in Japan, by the Japanese Representative (Cavazzoni Sub-Committee).	13 February 1928
O.C.	779	Drug Control in USA (Cavazzoni Sub-Committee). "Letter from the American consul at Geneva concerning the legislative and administrative measures taken in the U.S. to control the drug traffic".	13 March 1928

O.C.	780	Drug control in Italy (Cavazzoni Sub-Committee). "Laws and regulations in force in Italy". Communicated by the Italian Government.	26 March 1928
O.C.	782	Drug control in the Netherlands (Cavazzoni Sub-Committee). "Legislative and administrative measures taken in the Netherlands with regard to the control of the traffic in opium and other dangerous drugs".	30 March 1928
O.C.	783	Drug control in Switzerland (Cavazzoni Sub-Committee). "Note by Dr. Carrière on the Swiss regulations concerning trade in narcotics and on the memorandum by Mr. Cavazzoni".	
O.C.	851	Bolivian law concerning the traffic in drugs.	15 October 1928
O.C.	854	Persia: Opium monopoly law containing sixteen articles approved by the Majlis at its meeting on 17 July 1928. Communicated by the Persian Delegation to the Ninth Assembly.	7 November 1928
O.C.	864	Letter from His Majesty's Government concerning the extension of the provisions of the Dangerous Drugs Act of 1920, in accordance with the International Opium Convention of 1925.	11 October 1928
O.C.	865	Statement regarding results of enforcement of narcotic laws during 1928. Communicated by the United States Government through the Government of the Netherlands.	19 October 1928
O.C.	899	Society for the Suppression of the Opium Trade. Statement with regard to the manufacture of opium alkaloids in India.	2 January 1929
O.C.	918	Extract from the *Gaceta de Madrid* containing the text of Royal Decree No. 1350 dated 10 December 1928, which embodies the provisions relating to the establishing of stocks of narcotics and the entry into force of measures laid down in previous royal decrees relating to the new Spanish narcotic law.	14 January 1929
O.C.	924	Extract from the Afghan Penal Code.	17 January 1929
O.C.	929	Narcotic Substances Act of 15 December 1928, No. 1369, promulgated by the Turkish Republic.	18 January 1929
O.C.	930	Proposed scheme of monopolization of the manufacture and sale of morphine and other opium alkaloids in Chosen (Korea) and the measures to control and treat the morphine addicts. Communicated by the Japanese Government.	19 January 1929
O.C.	941	Report on the activities connected with the organization of, the production of and trade in raw opium in the Kingdom of the Serbs, Croats and Slovenes during the years 1926 to 1929. Communicated by the Representative of the Kingdom of the Serbs, Croats and Slovenes.	30 January 1929
O.C.	980	Letter from the Portuguese Government with Decree concerning licences to trade in drugs.	11 May 1929
O.C.	1047	Regulations for pharmacies and sale of pharmaceutical products in the Union of Socialist Soviet Republics.	14 September 1929
O.C.	1054	Text of Spanish laws.	
O.C.	1078	Federal law dated 23 October 1928: re traffic in and rules applicable to poisons (Poisons Act) in Austria.	25 November 1929
O.C.	1086	Letter from the Netherlands Government; re manufacture of narcotics in the Netherlands in 1928.	4 December 1929
O.C.	1103	Figures of consumption of drugs in Great Britain during the year 1928.	17 December 1929
O.C.	1107	Opium Ordinance of Formosa.	December 1929
O.C.	1120	Report of an enquiry by the National Health Insurance Department of Scotland to ascertain to what extent opium, morphine, cocaine, diamorphine and preparations containing them, were prescribed for the use of insured persons under the insurance scheme.	6 January 1930
O.C.	1144	Regulations concerning supervision over the traffic in opium. Communicated by the Yugoslav Government.	23 January 1930
O.C.	1144(a)	Law on traffic in and supervision over narcotic and poisonous drugs. Communicated by the Yugoslav Government.	25 January 1930
O.C.	1147	National Central Offices for Opium Affairs. Memorandum submitted by Mr. A. H. Sirks, Assessor to the Committee.	29 January 1930
O.C.	1193	Laws regulating traffic in narcotic drugs in Greece.	26 March 1930
O.C.	1239	Manufacture of narcotic drugs in the USSR. Regulations for the trade in narcotic drugs in the USSR.	22 July 1930

O.C.	1367	Regulations for the control of narcotic drugs in Japan, and for controlling Japanese vessels engaged in transporting opium.	24 March 1931
O.C.	1393	Letter from the Swiss Representative concerning the placing under control by Swiss law of peronin, ecgonin, etc.	10 October 1931
O.C.	1395	Contract between the Persian Government and the Concessionary for the exportation of Raw Opium.	16 February 1932
O.C.	1398 (Confidential)	Report on Mission to Turkey by the Director of the Opium Traffic and Social Questions sections.	26 February 1932
O.C.	1405	Report by Mr. Duncan Hall on his visits to India, Straits Settlements and Java.	7 April 1932
O.C.	1405(a)	Report by Mr. Duncan Hall on his visits to India, the Straits Settlements and Java. Letter from the Government (Central Revenues).	12 February 1934
O.C.	1444	Extension of control under the Swiss federal legislation to acedicone, its salts and preparations, codeine, dionine and their salts.	14 July 1932
O.C.	1447	Prohibition in Spain on importation and manufacture of diacetylmorphine and its chlorhydrates.	7 October 1932
O.C.	1450	State laws in the United States of America relating to the control of narcotic drugs and the treatment of drug addiction, and annexes 1 and 2.	26 October 1932
O.C.	1464	Decision by Turkey to accede to the Opium Conventions of 1912,	25 January 1933
O.C.	1464(a)	1925, 1931: other measures to control cultivation of the poppy, exports of raw opium and manufacture of narcotic drugs; prohibition of cultivation of Indian hemp.	10 July 1933
O.C.	1483	The narcotic drugs monopoly in Spain.	12 May 1933
O.C.	1488 and 1488(a)	Import and export certificate system as applied in Uruguay.	22 May 1933
O.C.	1506	Memorandum regarding the organization of the opium monopoly In Persia.	1 November 1933
O.C.	1519	Application of the import certificate system in China.	14 December 1933
O.C.	1520	Text of the new Turkish laws on the control of narcotic drugs and the narcotic drug monopoly.	20 December 1933
O.C.	1528	Control of narcotics in the Union of Soviet Socialist Republics.	13 March 1934
O.C.	1529	Ordinance No. 17, issued by the Government of the Leased Territory of Kwantung on 25 April 1933, for the control of opium in the South Manchurian Railway Zone.	6 April 1934
O.C.	1532	Central Opium Rules, India, dated 17 February 1934.	26 April 1934
O.C.	1539	Measures taken by governments against the abuse of narcotic drugs and for the purpose of preventing further development of such abuse.	15 May 1934
O.C.	1545	Method of preparing statistics of opium stocks in Yugoslavia.	22 May 1934
O.C.	1563	Working of the Convention for Limiting the Manufacture and Regulating Distribution of Narcotic Drugs of 1931 in the Netherlands.	29 June 1934
O.C.	1564	Laws and regulations governing the traffic in opium and opium-smoking in Manchuria and Jehol, territory also know as "Manchukuo".	20 July 1934
O.C.	1565	Control of trade in opium and other dangerous drugs with Manchuria and Jehol, territory also known as "Manchukuo".	20 July 1934
O.C.	1576 and 1576(1)	Latest and most important regulations concerning opium and dangerous drugs as now applied in China.	14 November 1934 9 May 1935
O.C.	1587	Creation in France of a special police service charged with centralizing all information which might facilitate the investigations into the prevention and suppression of the illicit traffic in narcotic drugs.	25 April 1935
O.C.	1591	"Manchukuo's" opium policy and measures taken for the treatment of opium smokers and drug addicts in "Manchukuo".	27 April 1935
O.C.	1606	Provisional translations of the regulations for the enforcement of the prohibition of opium and of narcotic drugs in China, April 1935.	31 May 1935
O.C.	1613	Report of the Central Turco-Yugoslav Bureau for the sale of raw opium.	17 September 1935

O.C.	1620	Situation in Bulgaria in regard to opium and other narcotic drugs.	12 February 1936
O.C.	1631	Draft scheme of study of national laws and regulations dealing with questions covered by the international drug conventions.	5 May 1936
O.C.	1639	Regulations governing the examination of postal matter and parcels used for smuggling of narcotic drugs promulgated in February 1936.	18 May 1936
O.C.	1639(a)	Regulations governing the organization of the opium-suppression commission of the Municipality of Greater Shanghai.	22 May 1936
		Provisional regulations governing the purchase of narcotic drugs.	
O.C.	1643	State monopolies in trade and manufacture of narcotic drugs covered by the limitation convention 1931.	21 May 1936
O.C.	1647	Supplementary information on opium control in Malaya in 1935.	23 May 1936
O.C.	1652	Situation in China.	27 May 1936
O.C.	1654	Draft resolution concerning the situation in the Far East submitted by Dr. Carrière (Switzerland), Mr. Hardy (India), Mr. Fuller (United States of America).	29 May 1936
O.C.	1658	Opium Amendment Act. B.E. 2478. Communicated by the Representative of Siam.	16 July 1936
O.C.	1659	Laws and regulations promulgated in the United States of America concerning the control of opium and other dangerous drugs. Communicated by the Government of the United States of America.	15 July 1936
O.C.	1665	Opium suppression in Hupeh province, China.	1 December 1936
O.C.	1671	Results achieved in Canada in relation to codeine control.	12 January 1937
O.C.	1711	Creation in Mexico of a national auxiliary organ for the control of narcotic drugs.	25 October 1937
O.C.	1712	Control of limitation of the manufacture of narcotic drugs in France. Application of the 1931 Convention.	1 November 1937
O.C.	1740	Limitation of poppy cultivation in Iran.	20 May 1938
O.C.	1752	Application of the national and provincial laws on narcotic drugs in the Argentine Republic.	15 December 1938
O.C.	1776	Yugoslavia. Text of a Decree of 10 December 1938, amending and supplementing the Law on Narcotic Drugs of 30 November 1931.	17 July 1939

B. International

O.C.	27	List of drugs not mentioned in the Hague Convention which produce similar effects to those which already come under the Convention, forwarded by the French Government.	17 April 1922
O.C.	30	Statement by Mrs. Hamilton Wright (on the reduction of production of opium).	
O.C.	58	Letter from Narcotic Drug Control League, New York, offering assistance and enclosing copy of Second Annual Report of Narcotic Drug Control Commission and Table of Imports of Opium and Opium Alkaloids.	17 August 1922
O.C.	76	Summary of replies received up to date with reference to annual requirements for internal consumption.	20 December 1922
O.C.	77	Report of the enquiry made by the Health Committee of the League into the world's requirements of dangerous drugs specified in chapter III of the International Opium Convention for legitimate consumption.	20 December 1922
O.C.	78	Memorandum by the Secretary on the extension of the import and export certificate system.	21 December 1922
O.C.	91	Memorandum presented by Mrs. Hamilton Wright containing a comparative table of statistics in the possession of the Bureau of International Revenue in the enforcement of the narcotic laws.	
O.C.	99	Resolutions forwarded by various voluntary organizations. The Harvard International Assembly, regarding 1. The suppression of the use of opium for any other needs except those of a strictly medical character. 2. Opium monopoly by governments. 3. The ratification of the Hague Convention 1912.	

		4. The ratification by Turkey of the Hague Convention of 1912. 5. The ratification by Persia of the Hague Convention of 1912.	
O.C.	99(a)	The International Anti-Opium Association, regarding 1. The control of the traffic in free ports and bonded warehouses. 2. The publicity of the meetings of the Advisory Committee. The Edinburgh Anti-Opium Association, regarding 1. An opium monopoly in China.	
O.C.	99(c)	The International Women's Suffrage Alliance, regarding 1. The cultivation of the poppy and the manufacture of dangerous drugs. 2. The limitation by governments of the use of drugs to the amounts required for medical and scientific purposes and the support of the League of Nations in its work to exterminate the illicit traffic.	
O.C.	99(d)	The Federal Council of the Churches of Christ in America, regarding 1. The representation of the United States of America on all international commissions dealing with humanitarian questions. 2. The next meeting of the Advisory Committee. 3. The representation of the United States of America at this meeting. The American Association of University Women, regarding the League of Nations. The Committee on Resolutions at Kansas City Convention, regarding 1. The passage of the Jone-Miller Bill. 2. The strict enforcement of narcotic laws. 3. Strict control of import and export of narcotics. Twelve associations (Press and otherwise), regarding 1. The appointment of Dr. Blue to the Advisory Committee and the organization of the Federal Narcotics Board. 2. The appointment of Dr. Alexander Lambert to convey the above resolution to the Secretary of State. The Foreign Policy Association and six other organizations, regarding 1. The co-operation of the United States of America with the League of Nations by means of the Advisory Committee.	
O.C.	99(e)	The Executive Committee of the League of Nations Union, regarding the limitation of world production of narcotic drugs to the world's requirements and the convening of the international conferences.	
O.C.	99(f)	The International Anti-Opium Association, regarding the confining of the use of opium to medical use only; the opposition to the legitimatizing of any use of opium except for medical requirements; and the registration of all present opium smokers.	
O.C.	99(g)	The International Missionary Union regarding the limitation of production to medical requirements only.	
O.C.	122	Summary of replies received from governments with reference to drugs coming under the provisions of article 14 of the Opium Convention of 1912.	
O.C.	128	Letter and memorandum from the British Government with regard to discrepancies existing between statistics submitted by Japan and other States.	14 May 1923
O.C.	129	Proposals submitted by the Delegation of USA with regard to production and control of opium products.	
O.C.	147	Recommendation with regard to the control of the import and export of opium, prepared by the Economic Section of the Secretariat.	21 July 1923
O.C.	151	Summary of replies to the circular letter with regard to the French list of drugs.	
O.C.	174	Suggestions for the Opium Preparatory Committee regarding the means of carrying out the principles accepted by the Assembly and the production of the poppy and the coca leaf restricted to medical use only, submitted by Mrs. Hamilton Wright.	

O.C.	181	Regulations in force in the Mandated Territories with regard to the International Convention on Opium on 1912. Summary prepared by the Secretariat.	9 May 1924
O.C.	188	List of laws regarding the traffic in opium, received by the Secretariat up to date.	23 June 1924
O.C.	213	Preliminary report on the substitution of other crops for the coca plant and the opium poppy. Submitted to the Preparatory Committee by the Agricultural Intelligence Office of the International Agricultural Institute.	August 1924
O.C.	214	Situation with regard to the position of governments concerning the exchange of information regarding seizures, with list of departments received by the Secretariat up to date.	August 1924
O.C.	218	Proposal by the German Representative with regard to the *pro rata* basis of manufacture.	
O.C.	220	Proposal by Mrs. Hamilton Wright with regard to the substitution of other crops to take the place of opium produced above the world's requirements.	12 August 1924
O.C.	289	Note by the Secretary of the Committee on the report of the Health Committee with regard to articles 8 and 10 of the International Opium Convention of 1925.	17 August 1925
O.C.	293	Summary of the drug situation in Mandated Territories prepared by the Secretariat.	7 August 1925
O.C.	303	Resolution by the National Christian Council with regard to the failure of the Geneva Conference to reach an agreement concerning the complete cessation of the opium traffic within a limited number of years.	7 August 1925
O.C.	317(1)	Revised list of countries with reference to the position as regards the adoption of the import certificate system.	27 August 1925
O.C.	359	Letter from the Union Catholique d'Etudes Internationales containing suggestions regarding co-operation with the Advisory Committee.	15 January 1926
O.C.	418	Information with regard to the drug situation in Mandated Territories. Memorandum by the Secretariat.	12 May 1926
O.C.	426	Report on the action taken by the Health Committee of the League of Nations in execution of articles 8 and 10 of the International Opium Convention of 19 February 1926.	
O.C.	434 (Confidential)	Notes on the position in certain South American countries as regards the traffic in opium and drugs. Communicated by the British Representative.	25 May 1926
O.C.	455	Letter from the Government of Czechoslovakia with regard to articles 13 and 15 of the Geneva Opium Convention of 1925 (export authorizations).	12 May 1926
O.C.	492	Collection of resolutions adopted by the Assembly, the Council and the Advisory Committee of the Traffic in Opium.	
O.C.	531	Note for the Advisory Committee on Traffic in Opium regarding the work of the Committee of Experts, forwarded by Dr. Carrière.	11 January 1927
O.C.	669	Report of Sub-Committee on the relation between the Central Board and Opium Advisory Committee.	1 October 1927
O.C.	681	Control of drug factories. Statement made by Colonel Woods.	6 October 1927
O.C.	759	Great Britain Foreign Office. Letter with regard to the mutual exchange of information concerning seizures (of opium) between Great Britain and the United States of America. Extension of agreements to the Philippine Islands.	April 1928
O.C.	766	Crane, Charles Kittredge. Scheme for the control of manufactured drugs. Forwarded by the Government of the United States of America through the Netherlands Government.	18 April 1928
O.C.	774 - 785	Advisory Committee on Traffic in Opium and Other Dangerous Drugs. Sub-Committee for the Study of Administrative Systems of Control and of the Cavazzoni Proposal (observations by the Governments of France, Germany, Great Britain, Italy, Japan, Netherlands, Switzerland and the United States).	31 January 1928
O.C.	775	Note by the British representative on the memorandum by M. Cavazzoni.	6 February 1928
O.C.	784	Telegram from Colonel Woods with regard to the Cavazzoni memorandum.	

O.C.	785	Comments on the Cavazzoni memorandum by the Treasury Department of the United States.	12 April 1928
O.C.	792	Sub-Committee for the Study of Administrative Systems of Control and of the Cavazzoni proposal. Report submitted by Dr. Carrière.	April 1928
O.C.	799	Mr. Dunham's observations on the report of the Cavazzoni Sub-Committee.	
O.C.	871	Extract from the Swiss Criminal Law review, 1928: "Legal aspects of the drug problem; communication by Professor Ernst Delaquis to the meeting of the International Criminal Police Commission held at Berne from 10-12 September 1928.	November 1928
O.C.	912	Scheme for the limitation of manufacture of narcotics, submitted by M. A. E. Blanco.	9 January 1929
O.C.	1016	Letter from Universal Postal Union re control of letting of post office boxes.	29 July 1929
O.C.	1089	Scheme for limitation of the output of manufactured drugs submitted by Mr. C. K. Crane. Letters from Belgium and Italy.	9 December 1929
O.C.	1123(2) and 1123(2)(a)	Revised provisional list, drawn up by the Sub-Committee of Experts, of substances and preparations coming under the Hague and Geneva Conventions (see also document O.C. 1409).	14 April 1932
O.C.	1126	Codification of certain categories of conventions.	16 January 1930
O.C.	1138	General principles which may be taken as a basis for the preparation of a convention on the limitation and rationing of the manufacture of narcotic drugs.	20 January 1930
O.C.	1190	Letter from the Hungarian Government regarding article 10 of the Geneva Convention, 1925.	26 March 1930
O.C.	1240	Conference of the countries manufacturing narcotic drugs to be convened by the Government of Great Britain.	24 July 1930
O.C.	1261	Conference on limitation of manufacture. Statistics contained in the replies of governments to C.L.116.1930.XI.	
O.C.	1282	Import and export certificate system: Modification. Proposal by the Government of Uruguay.	27 November 1930
O.C.	1294	Conference on the Limitation of the Manufacture of Narcotic Drugs.	
O.C.	1294(a), 1294(b)	Replies by the governments to Circular Letter C.L.116,1930.XI. (Conference on the Limitation of the Manufacture of Narcotic Drugs).	16 September 1930 21 October 1930 10 December 1930
O.C.	1294(c)	Further replies from governments to C.L.116.1930.XI. and C.L.-292(a).1930.XI.	31 January 1931
O.C.	1318	Administrative control of the drug traffic. Observations sent in by governments in reply to Circular Letter No. C.L.307.1929.XI.	30 December 1930
O.C. O.C.	1332(a) to 1332(1)	Documents concerning the draft convention for regulating the manufacture and supply of narcotic drugs, with amendments and texts as adopted by the 14th Session of the Opium Advisory Committee.	January 1931
O.C.	1334	Observations on the provisional plan of agreement with regard to the allocation of the quotas indicated in the report on the conference of manufacturing countries, held in London in October 1930, submitted by the Japanese Delegate.	10 January 1931
O.C.	1337	Conference on the Limitation of the Manufacture of Narcotic Drugs. Statement by the Turkish Representative.	9 January 1931
O.C.	1348	Letter from the President of the Permanent Central Opium Board regarding the representation of the Board at the coming Conference on the Limitation of the Manufacture of Narcotic Drugs.	14 January 1931
O.C.	1357 and 1357(1)	Report to the Council on the plan drawn up by the Advisory Committee with a view to the limitation of the manufacture of narcotics.	21 and 22 January 1931
O.C.	1358	Letter from the President of the Permanent Central Opium Board regarding the interpretation of article 24 of the Geneva Opium Convention 1925.	19 January 1931
O.C.	1363	Statement by the German Representative regarding the application of the import certificate system to codeine, benzylmorphine, etc.	27 January 1931
O.C.	1369	International Convention for the Suppression of the Illicit Traffic in Dangerous Drugs. Draft communicated by the Delegation of the International Criminal Police Commission.	30 January 1931

O.C.	1369(a), 1369(b), 1369(c)	Sub-Committee for international co-operation for the suppression of illicit traffic in narcotic drugs. Draft convention submitted by the International Criminal Police Commission.	12 May 1933, 13 May 1933, 18 May 1933, 24 May 1933
O.C.	1377	Declaration by the Representative of China as regards the application of ch. IV of the Hague Convention.	5 February 1931
O.C.	1379	List of government departments authorized to exchange information with regard to cases of illicit traffic and seizures of narcotic drugs (as at 29 January 1931).	5 February 1931, 7 April 1932, 24 June 1932
O.C.	1379(1) (C.96. M.32.1934.XI).	Revised list of government departments authorized to exchange information with regard to cases of illicit traffic and seizures of narcotic drugs (as at 1 February 1934).	12 February 1934
O.C.	1390	Exemption of preparations containing narcotic drugs from the application of the Geneva Convention, 1925.	12 May 1931
O.C.	1391	Note by the Acting Legal Adviser of the Secretariat regarding the application of article 8 of the Geneva Opium Convention, 1925.	4 May 1931
O.C.	1392	Memorandum on the draft convention communicated by the International Criminal Police Commission.	11 July 1931
O.C.	1406	Extension of the system of marking packages with serial numbers to drugs despatched by wholesale dealers (C.L.51.1929.XI. of 6 April and C.L.137.1930.XI. of July).	12 April 1932
O.C.	1407	Methods employed for the disposal of the drugs seized and the manner in which those seizures are shown in the national statistics by the governments (C.L.280.1931.XI. of 10 November).	7 April 1932
O.C.	1411	Application of articles 10 and 8 of the Geneva Opium Convention of 19 February 1925 (Replies to various circular letters).	8 April 1932
O.C.	1412	Request to Health Committee to seek a means of accelerating the procedure provided in article 10 of the Geneva Convention and of reducing its duration, if possible to a period of six months.	9 April 1932
O.C.	1413	Application of severe penalties to illicit traffickers and co-operation between the police authorities and between them and the Advisory Committee for the purpose of suppressing the illicit traffic.	12 April 1932
O.C.	1413(b)	Application of severe penalties to illicit traffickers and co-operation between them and the Advisory Committee. Letter from the Austrian representative dated 26 July 1932.	26 September 1932
O.C.	1422 series	Annual reports communicated to the League of Nations from territories in which the use of opium is temporarily authorized.	28 April 1933 24 and 31 May 1933
O.C.	1430	Statement regarding the work of the Bangkok Conference by the Director of the Opium Traffic and Social Questions sections.	19 April 1932
O.C.	1433	Penalties applicable under the laws on narcotics.	23 April 1932
O.C.	1433(a)	Penalties applicable under the laws on narcotics.	23 May 1933
O.C.	1449, 1449 (1) and 1449(2).	Preparatory work for a conference to consider the possibility of limiting and controlling the cultivation of the opium poppy and the cultivation and harvesting of the coca leaf (raw opium questionnaire).	10 October 1932 23 May 1933 31 May 1933
O.C.	1455	Resolution by the Senate of Canada against curtailment or interruption in the continuity of the work of the Opium Traffic Section.	15 March 1933
O.C.	1458(3)	Revised list, drawn up by the Sub-Committee of Experts, of drugs, preparations, and proprietary medicines coming under the Hague (1912) and Geneva (1925) Opium Conventions and the Limitation Convention (Geneva, 1931).	30 September 1937
O.C.	1458(3) Annexe Erratum	Revised list of drugs, preparations and proprietary medicines coming under the international drug conventions.	28 February 1938
O.C.	1458(3) Annexe 2nd erratum	Revised list of drugs, preparations and proprietary medicines coming under the international drug conventions.	15 October 1938
O.C.	1468	Questions regarding control of drug traffic discussed by the International Police Commission at a meeting held in Rome, October 1932.	28 March 1933
O.C.	1469	Extradition treaties for contravention of drugs laws.	28 March 1933
O.C.	1469(b)	Extradition treaties for contravention of drugs laws.	21 July 1936

O.C.	1472, 1472(a) and 1472(1)	Preparatory documentation for a conference to consider the possibility of limiting and controlling the cultivation of the opium poppy and the cultivation and harvesting of the coca leaf (coca leaf questionnaire).	24 April 1933 22 and 31 May 1933
O.C.	1478	Decision by the Health Committee to exempt, under article 8 of the Geneva Opium Convention, 1925, certain sterilized solutions of morphine and atropine in ampoules of 1.1 cc.	3 May 1933
O.C.	1480	Memorandum on certain difficulties of interpretation in connexion with article 11 of the Limitation Convention which affect the Model Administrative Code.	8 May 1933
O.C.	1482 and 1482(a)	Recommendation No. VI of the Final Act of the 1931 Limitation Conference concerning the abolition of the use of diacetylmorphine.	9 May 1933 24 January 1943
O.C.	1491	Preparatory work for a conference to consider the possibility of limiting and controlling the cultivation of the opium poppy and the cultivation and harvesting of the coca leaf. Text proposed by the British Representative for insertion in the report to the Council.	27 May 1933
O.C.	1501(3), 1501(2)	Observations by governments on the draft form of annual reports	7 May 1934
O.C.	1509	Respective competences of the Opium Advisory Committee, the Permanent Central Board and the Supervisory Body.	4 November 1933
O.C.	1515	Interpretation of the definition of "Preparation suitable for normal therapeutic use" as applied in article 13, paragraph 2 (*b*) of the 1931 Convention for limiting the manufacture and regulating the distribution of narcotic drugs.	7 November 1933
O.C.	1522	Convention for limiting the manufacture and regulating the distribution of narcotic drugs, of 13 July 1931. Application of article 18 regarding the disposal of seized narcotic drugs (letter from the Canadian Advisory Officer, Geneva).	22 January 1934
O.C.	1533	Request by the Egyptian Government that certain sterilized solutions of morphine or eucodal and atropine which, by a decision of the Health Committee, were exempted from the application of the Geneva Opium Convention of 1925 in virtue of its article 8, should again be brought within the scope of the convention.	2 May 1934
O.C.	1534 (C.159.M.-68. 1934. XI.) series	Draft: convention for the suppression of the illicit traffic in dangerous drugs.	3 May to 13 May 1934
O.C.	1535 series	Analytical study of the forms in use by governments in application of the import certificate and export authorization system.	14 May 1934 to 30 May 1935
O.C.	1535(h)	Application of the system of import certificates and export authorizations.	1 June 1937
O.C.	1535(i)	Application of the system of import certificates and export authorizations. Summary of replies to C.L.196.1935.XI.	28 April 1939
O.C.	1535(j)	Revision of document C.434.M.225.1935.XI, dated 2 November 1935, regarding the working of the system of import certificates and export authorizations.	28 April 1939
O.C.	1535(k)	Table giving the authorities issuing the import certificates and export authorizations in the various countries.	26 May 1939
O.C.	1547	Sub-Committee instructed to study the question of the extension of the system of serial numbering of receptacles to drugs consigned by wholesale traders. — Note by M. Razet, Head of the French Bureau des Stupéfiants, on the operation of the system of numbering receptacles in France	23 May 1934
O.C.	1548	Value of the legitimate trade in dangerous drugs and financial losses sustained by the community as a result of drug addiction.	24 May 1934
O.C.	1549	Measures taken by governments against the abuse of narcotic drugs and for the purpose of preventing the further development of such abuse.	25 May 1934
O.C.	1550	Manufacture and export of drugs. Extension of manufacture to new manufacture countries.	25 May 1934
O.C.	1550 Erratum	Manufacture and export of drugs. Extension of manufacture to new manufacturing countries.	11 July 1934
O.C.	1552	Extradition for offences against the laws on opium and other dangerous drugs. Progress made in recent extradition treaties.	25 May 1934

O.C.	1553 (C.H.1151) and 1553(1)	Report of the Joint Sub-Committee of the Advisory Committee and the Health Committee appointed to examine Recommendation X of the Bangkok Conference.	26 and 30 May 1934
O.C.	1558 series	Draft international convention for the suppression of illicit traffic in dangerous drugs.	29 May 1934
O.C.	1559	Extension of serial numbering to wholesalers.	30 May 1934
O.C.	1568	Interpretation of article 7 of The Hague Convention and of articles V and VI of the Geneva Opium Agreement (1925) (memorandum by the Representative of Siam).	19 September 1934
O.C.	1568 Erratum	Interpretation of article 7 of The Hague Convention and of articles V and VI of the Geneva Opium Agreement (1925).	19 September 1934
O.C.	1573	Organization of the police with a view to the campaign against the clandestine manufacture of and illicit traffic in narcotic drugs.	5 November 1934
O.C.	1578	Restriction of the number of licences to manufacture drugs. Resolution adopted on 20 November 1934.	20 November 1934
O.C.	1586	Information regarding the action taken and the methods adopted by international associations and missionary organizations in the campaign against narcotic drugs.	29 March 1935
O.C.	1596	Application of article 10 of the 1931 Convention in regard to the export and import of diacetylmorphine.	14 May 1935
O.C.	1596(a)	Application of article 10 of the 1931 Convention in regard to the export and import of diacetylmorphine.	14 February 1936
O.C. (O.C.S.239)	1597	Some statistical data supplied by the Opium Suppression Supervisory Bureau in October 1934.	16 May to 24 May 1935
O.C.	1627, 1627(1)	Specialized police services dealing with the campaign against narcotic drugs.	4 May 1936, 12 November 1936, 23 November 1937
O.C.	1632, 1632(a) 1632(b) 1932(c)	Regulations applicable to, and control over, pharmacies.	5 May 1936, 27 May 1936, 10 May 1937, 1 June 1937
O.C.	1632(c)(1)	Annex to C.L.192,137.XI. Rules recommended for the effective control over pharmacies.	9 June 1937
O.C.	1636 and 1636(a)	Establishment by the governments of a single authority responsible for the supervision of narcotic drugs.	12 May 1936, 16 May 1939
O.C.	1641	Preparatory work with a view to the possibility of limiting and controlling the cultivation of the opium poppy and the cultivation and harvesting of the coca leaf.	18 May 1936
O.C.	1644	The work of the Supervisory Body.	21 May 1936
O.C.	1648	Communication to the Finnish Government with reference to the interpretation of article 10 of the Limitation Convention 1931.	23 May 1936
O.C.	1662	Results of the application of the international opium conventions as regards the manufacture, export and consumption of dangerous drugs.	30 July 1936
O.C.	1666	Communication of laws and regulations under article 21 of the Convention for limiting the manufacture and regulating the distribution of narcotic drugs.	4 December 1936
O.C.	1677 and addendum	Preparatory work for a conference to consider the possibility of limiting and controlling the cultivation of the opium poppy and the production of raw opium.	10 March 1937 and 26 May 1937
O.C.	1677(a)	Replies to the questionnaire (document C.640.M.302.1933.XI — O.C. 1449, (2), by the Government of India in respect of British India and the Indian states.	10 March 1937
O.C.	1677(b)	Replies to the questionnaire (document C.640.M.302.1933.XI — O.C. 1449, (2), by the Government of China.	13 May 1937
O.C.	1677(c)	Replies to the questionnaire (document C.640.M.302.1933.XI — O.C. 1449, (2), by the Government of Japan.	18 May 1937
O.C.	1698	Measures for the search of narcotics in the railways. Measures to prohibit railway officials and workers from aiding in the smuggling of narcotics.	24 May 1937
O.C.	1728 and 1728(a)	Measures to prevent the use of ocean-going steamers for illicit traffic and supervision in the larger seaports.	13 May 1938, 23 May 1938
O.C.	1745(a) and addendum	Draft report concerning the preparatory work for a conference to consider the possibility of limiting and controlling the cultivation of the opium poppy and the production of raw opium.	21 June 1938, 23 June 1938

O.C.	1751	Report to the Council concerning the preparatory work for a conference to consider the possibility of limiting and controlling the cultivation of the opium poppy and the production of raw opium and controlling other raw materials for the manufacture of opium alkaloids. Observations by governments in regard to C.L.192.1938.XI. Replies of Canada and Ireland.	10 December 1938
O.C.	1751(a)	Replies of Costa Rica, Egypt, Finland, Guatemala, Iraq, Monaco, Roumania, Sudan and Iceland.	14 January 1939
O.C.	1751(b)	Replies of Greece, Hungary, New Zealand, Sweden and Guatemala.	7 February 1939
O.C.	1751(c)	Replies of Australia, France, Latvia, Netherlands, Siam and Union of South Africa.	20 February 1939
O.C.	1751(d)	Replies of Bulgaria, Norway, Switzerland and Venezuela.	2 March 1939
O.C.	1751(e) and addendum	Reply of India.	6 March 1939, 3 May 1939
O.C.	1751(f)	Replies of Poland and the United States of America.	22 April 1939
O.C.	1751(g)	Reply of Yugoslavia.	3 May 1939
O.C.	1751(h)	Reply of Turkey.	3 May 1939
O.C.	1751(i)	Reply of the United Kingdom, Burma, Straits Settlements, Hong Kong, Sarawak, Aden, Ceylon, and British North Borneo.	22 May 1939
O.C.	1767	Application of article 10 of the 1925 Convention and article 11 of the 1931 Convention for limiting the manufacture of drugs.	16 May 1939
O.C.	1775	Draft report concerning the preparatory work for a conference to consider the possibility of limiting and controlling the cultivation of the opium poppy and the production of raw opium and controlling other raw materials for the manufacture of opium alkaloids.	11 June 1939

C. Systematic account of the work of the International Bodies dealing with narcotics

Advisory Committee on Traffic in Opium

Rules of procedure (as amended by the Advisory Committee at its fifth session, May-June 1923).	O.C.123(1)
Minutes of the sessions of the Committee:	
First session (2-5 May 1921)	C.77.M.39.1921.XI
Second session (19-29 April 1922)	C.416.M.254.1922.XI
Third (emergency) session (1 September 1922)	C.72.M.27.1923.XI
Fourth session (8-14 January 1923)	C.155.M.27.1923.XI
Fifth session (24 May-7 June 1923)	C.41.M.184.1923.XI
Sixth session (4-14 August 1924)	C.397.M.146.1924.XI
Seventh session (24-31 August 1925)	C.602.M.192.1925.XI
Eighth session (26 May-8 June 1926)	C.393.M.136.1926.XI Ser.L.o.N.P.1926.XI.4
Ninth session (17 January-3 February 1927)	C.86.M.35.1927.XI Ser.L.o.N.P.1927.XI.2
Tenth (extraordinary) session (28 September-8 October 1927)	C.557.M.199.1927.XI Ser.L.o.N.P.1927.XI.10
Eleventh session (12-27 April 1928)	C.328,M.88.1928.XI (O.C.816) Ser.L.o.N.P.1928.XI.3
Twelfth session (17 January-2 February 1929)	C.134.M.49.1929.XI Ser.L.o.N.P.1929.XI.2
Thirteenth session (20 January-14 February 1930)	C.121.M.39.1930.XI Ser.L.o.N.P.1930.XI.1
Fourteenth session (9 January-7 February 1931)	Vol.I.C.88.M.34.1931.XI.Vol.I Ser.L.o.N.P.1931.XI.2/I Vol.II.C.88.M.34.1931.XI.Vol.II Ser.L.o.N.P.1931.XI.2/II
Fifteenth session (15 April-4 May 1932)	C.575.M.282.1932.XI Ser.L.o.N.P.1932.XI.4
Sixteenth session (15-31 May 1933)	C.480.M.244.1933.XI Ser.L.o.N.P.1933.XI.3

Seventeenth session (30 October-9 November 1933)	C.661.M.316.1933.XI Ser.L.o.N.P.1933.XI.6
Eighteenth session (18 May-2 June 1934)	C.317.M.142.1934.XI Ser.L.o.N.P.1934.XI.3
Nineteenth session (15-28 November 1934)	C.33.M.14.1935.XI Ser.L.o.N.P.1935.XI.1
Twentieth session (20 May-5 June 1935)	C.277.M.144.1935.XI. Ser.L.o.N.P.1935.XI.6
Twenty-first session (18 May-5 June 1936)	C.290.M.176.1936.XI Ser.L.o.N.P.1936.XI.17
Twenty-second session (24 May-12 June 1937)	C.315.M.211.1937.XI Ser.L.o.N.P.1937.XI.6
Twenty-third session (7-24 June 1938)	C.249.M.147.1938.XI Ser.L.o.N.P.1938.XI.4
Twenty-fourth session (15 May-12 June 1939)	C.209.M.136.1939.XI Ser.L.o.N.P.1939.XI.5
Twenty-fifth session (13-17 May 1940)	C.162.M.147.1940.XI Ser.L.o.N.P.1941.XI.1

Reports to the Council on the work of the Advisory Committee:

First session (2-5 May 1921)	A.38.1921.XI
Second session (19-29 April 1922)	A.15.1922.XI
Third session (emergency meeting) (1 September 1922)	A.15(a).1922.XI
Fourth session (8-14 January 1923)	C.37.M.91.1923.XI
Fifth session (24 May-7 June 1923)	A.13.1923.XI
Sixth session (4-14 August 1924)	A.32.1924.XI
Seventh session (24-31 August 1925)	A.28.1925.XI
Eighth session (26 May-8 June 1926)	A.20.1926.XI
Ninth session (17 January-3 February 1927)	A.29.M.19.1927.XI Ser.L.o.N.P.1927.XI.1
Tenth (extraordinary) session (28 September-8 October 1927)	C.521.M.179.1927.XI Ser.L.o.N.P.1927.XI.9
Eleventh session (12-26 April 1928)	A.7.1928.XI Ser.L.o.N.P.1928.XI.2
Twelfth session (17 January-2 February 1929)	C.33.1929.XI Ser.L.o.N.P.1929.XI.1
Thirteenth session (20 January-14 February 1930)	C.138.M.51.1930.XI Ser.L.o.N.P.1930.XI.2
Fourteenth session (9 January-7 February 1931)	C.138(a).M.62(a).1931.XI Ser.L.o.N.P.1931.XI.4
Fifteenth session (15 April-4 May 1932)	C.240.M.229.1932.XI Ser.L.o.N.P.1932.XI.2
Sixteenth session (15-31 May 1933)	C.385.M.193.1933.XI Ser.L.o.N.P.1933.XI.1
Seventeenth session (30 October-9 November 1933)	C.642.M.305.1933.XI Ser.L.o.N.P.1933.XI.5
Eighteenth session (18 May-2 June 1934)	C.256.M.105.1934.XI Ser.L.o.N.P.1934.XI.1
Nineteenth session (15-18 November 1934)	C.530.M.241.1934.XI Ser.L.o.N.P.1934.XI.6
Twentieth session (20 May-5 June 1935)	C.253.M.125.1935.XI Ser.L.o.N.P.1935.XI.2
Twenty-first session (18 May-5 June 1936)	C.278.M.168.1936.XI Ser.L.o.N.P.1936.XI
Twenty-second session (24 May-12 June 1937)	C.285.M.186.1937.XI Ser.L.o.N.P.1937.XI.4
Twenty-third session (7-24 June 1938)	C.237.M.136.1938.XI Ser.L.o.N.P.1938.XI.2
Twenty-fourth session (15 May-12 June 1939)	C.202.M.131.1939.XI Ser.L.o.N.P.1939.XI.4
Twenty-fifth session (13-17 May 1940)	C.125.M.114.1940.XI Ser.L.o.N.P.1940.XI.3

Minutes of the sessions of the Joint Sub-Committee of the Health Committee and the Advisory Committee on Traffic in Opium:	
First session (4-6 January 1923)	C.79.M.33.1923.XI
Second session (5-7 September 1923)	C.746.M.308.1923.XI
Annual reports by governments	
Summary of Annual Reports, 1926	O.C.415. Ser.L.o.N.P.1926.XI.3
Summary of Annual Reports, 1927	O.C.507. Ser.L.o.N.P.1927.XI.3
Summary of Annual Reports, 1928	O.C.693. Ser.L.o.N.P.1928.XI.1
Summary of Annual Reports, 1929	O.C.877. Ser.L.o.N.P.1929.XI.3
Summary of Annual Reports, 1930	O.C.1072. Ser.L.o.N.P.1930.XI.5
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the years 1929 and 1930	C.329.M.200.1932.XI Ser.L.o.N.P.1932.XI.3
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1931	C.236.M.123.1933.XI Ser.L.o.N.P.1933.XI.2
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1932	C.312.M.1934.XI Ser.L.o.N.P.1934.XI.2
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1933	C.258.M.130.1935.XI Ser.L.o.N.P.1935.XI.4
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1934	C.299.M.182.1936.XI Ser.L.o.N.P.1936.XI.15
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1935	C.305.M.203.1937.XI Ser.L.o.N.P.1937.XI.5
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1936	C.241.M.140.1938.XI Ser.L.o.N.P.1938.XI.3
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1937	C.218.M.146.1939.XI Ser.L.o.N.P.1939.XI.6
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1938	C.124.M.113.1940.XI Ser.L.o.N.P.1942.XI.1
Summary of Annual Reports of Governments on the Traffic in Opium and Other Dangerous Drugs for the year 1939	C.76.M.76.1942.XI Ser.L.o.N.P.1942.XI.1
Analytical Study of Annual Reports by Governments on the Traffic in Opium and Other Dangerous Drugs for year 1940	C.177.M.177.1945.XI Ser.I.o.N.P.1945.XI.2
International conventions and agreements	
International Opium Convention signed at the Hague, 23 January 1912	O.C.I.(I)
First Opium Conference (3 November 1924-11 February 1925):	
Summary of the Information received from Governments with regard to Prepared Opium in the European Possessions and Countries of the Far East	C.O.P.I.
Agreement, Protocol and Final Act, signed on 11 February 1925	C.82.M.41.1925.XI C.O.P.57(I)
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Second Opium Conference (17 November 1924-19 February 1925):	
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Part II: Estimated annual requirements of Opium and its Derivatives reduced to their Morphine contents, together with Estimated Requirements of Cocaine and Other Narcotics	O.D.C.I.(I) C.656.M.234.1924.XI
Convention, Protocol and Final Act	C.88.M.44.1925.XI
Records of the Conference; in two volumes	C.760.M.260.1924.XI
Index to the Records	C.603.M.237.1926.XI Ser.L.o.N.P.1926.XI.9
Conference on the Limitation of the Manufacture of Narcotic Drugs (May-July 1931):	
Statistics of the Manufacture of Narcotic Drugs, 1925-1928	C.356.M.148.1930.XI Ser.L.o.N.P.1930.XI.4
Report of the Preliminary Meeting of Official Representatives of the Manufacturing Countries	C.669.M.278.1930.XI Ser.L.o.N.P.1930.XI.8
Reports and Draft Convention on the Limitation of the Manufacture of Narcotic Drugs: Extract from the Minutes of the 62nd session of the Council, Report of the Advisory Committee, Draft Convention	C.168.M.62.1931.XI Ser.L.o.N.P.1931.XI.3
Analysis of the International Trade in Morphine, Diacetylmorphine and Cocaine for the years 1925-1929:	
Part I	C.587.M.228.1930.XI Ser.L.o.N.P.1931.XI.5/I
Part II — General analysis, morphine and diacetylmorphine	C.587.M.228.1930.XI Ser.L.o.N.P.1931.XI.5/II
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Scheme for Limiting the Output of Manufactured Drugs	C.251.M.114.1931.XI Ser.L.o.N.P.1931.XI.6
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Records of the Conference:	
Vol. I. Plenary Meetings, text of the Debates	C.509.M.214.1931.XI Ser.L.o.N.P.1931.XI.10
Vol. II. Meetings of the Committees and the Sub-Committees on Control	C.509.M.214.1931.XI.Vol.II Ser.L.o.N.P.1931.XI.10/II
Model Administrative Codes to the International Opium Conventions of 1925 and 1931	C.774.M.365.1932.XI Ser.L.o.N.P.1932.XI.8
Conference on the Suppression of Opium-smoking (9-27 November 1931):	
Minutes of the Meetings and Documents submitted to the Conference	C.577.M.284.1932.XI Ser.L.o.N.P.1932.XI.1
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Conference for the Suppression of the Illicit Traffic in Dangerous Drugs (8-26 June 1936): Records of the Conference, text of the Debates	C.341.M.216.1936.XI Ser.L.o.N.P.1936.XI.20
Report to the Council, with revised text of the Draft Convention	Conf.S.T.B.2 S.T.D./C.E.18(1) Ser.L.o.N.P.1936.XI.3
Conference called to conclude a Convention for the Suppression of the Illicit Traffic in Dangerous Drugs: Article 1, Paragraph 2(b), of the Draft Convention. Replies by Governments to the Secretary-General's letter of 31 January 1936	C.L.18.1936.XI Conf.S.T.D.3 Ser.L.o.N.P.1936.XI.6
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Extradition under Existing Treaties for Offences against Drug Laws. Replies by Governments to the Circular Letter of 8 February 1936	C.L.22.1936.XI Conf.S.T.D.4.1936.XI Ser.L.o.N.P.1936.XI.7
Text of the Draft Convention, with observations of the Governments on the first and second consultations	Conf.S.T.D.1 Ser.L.o.N.P.1935.XI.10
Convention of 1936 for the Suppression of the Illicit Traffic in Dangerous Drugs	C.286.M.174.1936.XI Ser.L.o.N.P.1936.XI.12
Protocol of Signature	C.286(a).M.174(a).1936.XI Ser.L.o.N.P.1936.XI.12
Final Act	C.286(b).M.174(b).1936.XI Ser.L.o.N.P.1936.XI.13
Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs of 13 July 1931:	
Historical and Technical Study by the Opium Traffic Section of the Secretariat of the League of Nations	C.191.M.136.1937.XI Ser.L.o.N.P.1937.XI.3
Conference for the Adoption of a Protocol to extend to Dihydrocodeine and its Salts certain provisions of the Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs of 13 July 1931:	
Replies from Governments to the Secretary-General's Letter of 19 February 1938	Conf.Dihydrocodeine 1 Ser.L.o.N.P.1939.XI.1
Draft Supplementary Protocol, revised text, adopted by the Advisory Committee on Traffic in Opium and other Dangerous Drugs at its 24th session (May 1939)	Conf.Dihydrocodeine 2 Ser.L.o.N.P.1939.XI.2
Conference to consider the Possibility of Limiting and Controlling the Cultivation of the Opium Poppy and the Production of Raw Opium and Controlling other Raw Materials for the Manufacture of Opium Alkaloids:	
Report to the Council concerning the Preparatory Work for the Conference, drawn up by the Advisory Committee at its 23rd session (May-June 1938)	C.221.M.123.1938.XI Ser.L.o.N.P.1938.XI.1
Report to the Council concerning the Preparatory Work for the Conference, drawn up by the Advisory Committee at its 24th session (May-June 1939)	C.175.M.104.1939.XI Ser.L.o.N.P.1939.XI.3
Reports to the Council of the Permanent Central Opium Board	
Preliminary Report to the Council on the Work accomplished by the P.C.O.B. during its third, fourth and fifth sessions, in 1929 and 1930	C.241.M.120.1930.XI Ser.L.o.N.P.1930.XI.3
* Report to the Council on the Work of the P.C.O.B. during its sixth and seventh sessions, and on the Statistics for the year 1929	C.629.M.250.1930.XI C.C.P.54 Ser.L.o.N.P.1930.XI.7
Report to the Council on the Work of the P.C.O.B. during its eighth, ninth and tenth sessions, and on the Statistics for the year 1930	C.439.M.186.1931.XI C.C.P.78 Ser.L.o.N.P.1931.XI.9
Report to the Council on the Work of the P.C.O.B. during its eleventh, twelfth and thirteenth sessions, and on the Statistics for the year 1931	A.35.1932.XI Ser.L.o.N.P.1932.XI.6
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Report to the Council on the Work of the P.C.O.B. during its eighteenth, nineteenth, twentieth and twenty-first sessions and on the Statistics for the year 1933, supplied in virtue of the Opium Convention of 1925	C.390.M.176.1934.XI Ser.L.o.N.P.1934.XI.4

* First annual report submitted to the Council by the P.C.O.B. since its constitution.

Report to the Council on the Work of the P.C.O.B. during its twenty-second, twenty-third, twenty-fourth and twenty-fifth sessions	C.364.M.185.1935.XI Ser.L.o.N.P.1935.XI.8
Report to the Council on the Work of the P.C.O.B. during its twenty-sixth, twenty-seventh and twenty-eighth sessions	C.368.M.242.1936.XI.19
Report to the Council. Statistics relating to the year 1934 furnished to the P.C.O.B. under the terms of the 1925 and 1931 Conventions	C.1.M.1.1936.XI Ser.L.o.N.P.1936.XI.1
Statistics relating to the year 1935 furnished to the P.C.O.B. under the terms of the 1925 and 1931 Conventions	C.449.M.265.1936.XI Ser.L.o.N.P.1936.XI.21
Report to the Council on the Statistics for the year 1936 and the Work of the P.C.O.B. during the year 1937	C.353.M.240.1937.XI Ser.L.o.N.P.1937.XI.8
Report to the Council on the Statistics of Narcotics for the year 1937 and the Work of the Board during 1938	C.482.M.325.1938.XI Ser.L.o.N.P.1938.XI.5
Report to the Council on the Statistics of Narcotics for the year 1938 and the Work of the Board during 1939	C.261.M.179.1939.XI Ser.L.o.N.P.1939.XI.8
Report to the Council on the Statistics of Narcotics for the year 1939 and the Work of the Board during 1940	C.157.M.143.1940.XI Ser.L.o.N.P.1940.XI.5
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Report to the Council on Measures to Re-establish the Control of Dangerous Drugs in Liberated and Occupied Countries	C.14.M.14.1944.XI Ser.L.o.N.P.1944.XI.2
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Special inquiries

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Commission of Inquiry into the Production of Opium in Persia; Report to the Council	A.7.1927.XI Ser.L.o.N.P.1926.XI.10
Observations of the Persian Government on the Report by the Commission of Inquiry, and Extract from the Minutes of the 6th meeting of the 44th session of the Council, 11 March 1927	A.8.1927.XI Ser.L.o.N.P.1927.XI.4
Letter from the Chairman of the Commission	A.16.1927.XI Ser.L.o.N.P.1927.XI.5
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Volume I — report with comparative maps, illustrations and tables	C.635.M.254.1930.XI Ser.L.o.N.P.1930.XI.10
Volume II — detailed memoranda on each territory visited by the Commission	C.635.M.254.1930.XI.Vol.II Ser.L.o.N.P.1930.XI.10/II
Volume III — collection of laws and regulations governing the control of opium smoking in the territories visited by the Commission of Inquiry	C.635.M.254.1930.XI.Vol.III Ser.L.o.N.P.1930.XI.10/III
Studies and Documents regarding the working of the System of Import Certificates and Export Authorization	C.434.M.225.1935.XI Ser.L.o.N.P.1935.XI.11

Publications of the Supervisory Body

Estimated World Requirements of Dangerous Drugs in 1935. Statement issued by the Supervisory Body under article 5	C.462.M.198.1934.XI Ser.L.o.N.P.1934.XI.5

First Supplement to the Statement	C.462(a).M.198(a).1934.XI Ser.L.o.N.P.1935.XI.3
Second Supplement	C.462(b).M.198(b).1934.XI Ser.L.o.N.P.1935.XI.5
Third Supplement	C.462(c).M.198(c).1934.XI Ser.L.o.N.P.1935.XI.7
Fourth Supplement	C.462(d).M.198(d).1934.XI Ser.L.o.N.P.1935.XI.12
Fifth Supplement	C.462(e).M.198(e).1934.XI Ser.L.o.N.P.1936.XI.2
Sixth Supplement	C.462(f).M.198(f).1934.XI Ser.L.o.N.P.1936.XI.4
Procès-verbal to alter the Latest Date of Issue of the Annual Statement of the Estimated World Requirements of Dangerous Drugs	C.286(c).M.174(c).1936.XI Ser.L.o.N.P.1936.XI.14
Estimated World Requirements of Dangerous Drugs in 1936. Statement issued by the Supervisory Body	C.429.M.220.1935.XI Ser.L.o.N.P.1935.XI.9
First Supplement	C.429(a).M.220(a).1935.XI Ser.L.o.N.P.1936.XI.5
Second Supplement	C.429(b).M.220(b).1935.XI Ser.L.o.N.P.1936.XI.9
Third Supplement	C.429(c).M.220(c).1935.XI Ser.L.o.N.P.1936.XI.16
Fourth Supplement	C.429(d).M.220(d).1935.XI Ser.L.o.N.P.1936.XI.18
Fifth Supplement	C.429(e).M.220(e).1935.XI Ser.L.o.N.P.1936.XI.22
Sixth Supplement	C.429(f).M.220(f).1935.XI Ser.L.o.N.P.1937.XI.1
Seventh Supplement	C.429(g).M.220(g).1935.XI Ser.L.o.N.P.1937.XI.2
Estimated World Requirements of Dangerous Drugs in 1937; Statement issued by the Supervisory Body	C.547.M.353.1936.XI Ser.L.o.N.P.1936.XI.2
Estimated World Requirements of Dangerous Drugs in 1938; Statement issued by the Supervisory Body	C.544.M.381.1937.XI Ser.L.o.N.P.1937.XI.7
Estimated World Requirements of Dangerous Drugs in 1939; Statement issued by the Supervisory Body	C.488.M.331.1938.XI Ser.L.o.N.P.1938.XI.6
Estimated World Requirements of Dangerous Drugs in 1940; Statement issued by the Supervisory Body	C.379.M.292.1939.XI Ser.L.o.N.P.1939.XI.9
Estimated World Requirements of Dangerous Drugs in 1941; Statement issued by the Supervisory Body	C.155.M.141.1940.XI Ser.L.o.N.P.1940.XI.4
Estimated World Requirements of Dangerous Drugs in 1942; Statement issued by the Supervisory Body	C.61.M.58.1941.XI Ser.L.o.N.P.1941.XI.2
Estimated World Requirements of Dangerous Drugs in 1943; Statement issued by the Supervisory Body	C.82.M.82.1942.XI Ser.L.o.N.P.1942.XI.2
Estimated World Requirements of Dangerous Drugs in 1944; Statement issued by the Supervisory Body	C.29.M.29.1943.XI Ser.L.o.N.P.1943.XI.1
Estimated World Requirements of Dangerous Drugs in 1945; Statement issued by the Supervisory Body	C.33.M.33.1944.XI Ser.L.o.N.P.1944.XI.3
Estimated World Requirements of Dangerous Drugs in 1946; Statement issued by the Supervisory Body	C.119.M.119.1945.XI Ser.L.o.N.P.1945.XI.3

IV. DRUG ADDICTION

O.C.	99(b)	The League of Red Cross Societies, regarding propaganda work.	
O.C.	233	Letter from the League of Red Cross Societies offering assistance with regard to educational propaganda.	20 September 1924
O.C.	239	Note by the Secretary on educational propaganda, including the text of a resolution adopted by the Council, a letter received from the League of Red Cross Societies and the report of the Health Committee adopted in the course of its third session.	31 December 1924
O.C.	299	Council resolution on educational propaganda.	7 August 1925
O.C.	341(b)	Notes by Professor Knaffl-Lenz on the value of strychnine and caffein pills as opium substitute.	
O.C.	341(c)	Notes by Professor Knaffl-Lenz on the chemical and pharmaceutical examination of anti-opium pills.	
O.C.	1124	The treatment of opium and morphine addicts in Japan.	14 January 1930
O.C.	1167	Cases of codein addiction. Article by Dr. Hans Schwartz.	10 February 1930
O.C.	1167(a)	Cases of codein addiction. Letter from the German Representative.	15 September 1930
O.C.	1188 and	The curing of drug addicts by vesicatory serum. Dr. P. Modinos'	20 March 1930
O.C.	1188(a) to (c)	method.	
O.C.	1308	Treatment of morphinism. Letter from Dr. Bruno Schultz, Austrian Representative.	12 December 1930
O.C.	1317	Regulations governing grants for the treatment of opium addicts in the Netherlands Indies.	19 December 1930
O.C.	1408	Enquiry into drug addiction (C.L.294.1931.XI of 23 November).	14 April 1932
O.C.	1408(1)	Enquiry into drug addiction.	12 February 1934
O.C.	1408(1)(a)	Employment of visiting nurses in the Netherlands Indies (enquiry into drug addiction).	26 January 1934
O.C.	1408(1)(b)	Treatment of opium smokers in Formosa: report on statistical research (enquiry into drug addiction).	7 March 1934 20 May 1935
O.C.	1408(1)(c)	Report by the Government Clinic for Treatment of Opium and Drug Addicts in Kwantung Leased Territory (Dairen) (enquiry into drug addiction).	7 March 1934
O.C.	1408(1)(d)	Treatment of Drug Addicts in Chosen (enquiry into drug addiction).	7 March 1934
O.C.	1408(1)(e)	Brief note on the present state of the question: enquiry into drug addiction.	22 May 1934
O.C.	1408(1)(f)	Activities of the Anti-Opium Clinic maintained by Chinese Residents in Singapore (enquiry into drug addiction).	23 November 1934
O.C.	1408(1)(g)	Enquiry into drug addiction (revised).	25 May 1936
O.C.	1408(1)(h)	Enquiry into drug addiction. Present state of the question and list of the principal documents published on the subject.	2 December 1938
O.C.	1453	Formulae for the anti-opium pills used by the Persian Government in treating drug addicts.	1 November 1932
O.C.	1460 and	Connexion between crime and drug addiction (comments by the	12 January 1933
O.C.	1460(a)	United States of America).	26 July 1933
O.C.	1461 (Confidential)	Enquiry into drug addiction.	17 January 1933
O.C.	1462	Press reports regarding drug addiction prevalent in the Belgian Army.	18 January 1933
O.C.	1473 and 1473(a) and 1473(b)	Documentary investigation into opium-smoking among workers requested by the International Labour Office.	27 April, 24 May 1933 13 January 1936
O.C. O.C. O.C.	1473(c) 1473(d) 1473(e)	Documentary investigation into opium-smoking among workers requested by the International Labour Office.	18 March and 22 July and 10 February 1937
O.C.	1499	Measures against drug addiction in Colombia.	1 November 1933
O.C.	1526	Some medical and economic considerations regarding replacement of more dangerous by less dangerous opiates.	14 February 1934
O.C.	1551	Measures taken by governments against drug addiction and for the purpose of preventing further development thereof.	25 May 1934
O.C.	1555	Use of tea as a stimulant or narcotic.	28 May 1934
O.C.	1570	Control of drug addiction in Chosen.	24 October 1934
O.C.	1570(a)	The treatment of drug addicts in Hokaido province, Chosen. Communicated by the Japanese Representative.	18 May 1936
O.C.	1571	Addiction liability of codeine.	30 October 1934

O.C.	1583	Regulations governing the admission of persons to a United States narcotic farm.	9 March 1935
O.C.	1602	A comfortable and spontaneous cure of the opium habit by a lecithin diet.	18 May 1935
O.C.	1605(b)	Symposium on drug addiction entitled "Hospital News".	17 March 1937
O.C.	1605(c)	Activities of the United States Public Health Service in connexion with the treatment of drug addiction. Statement by Dr. Walter L. Treadway.	23 August 1937
O.C.	1605(d)	Information concerning the work of addict hospitals in the United States.	19 July 1938
O.C.	1605(e)	Activities of the United States Public Health Service in connexion with the treatment of drug addiction.	16 May 1939
O.C.	1614	Experience in the United States of America with the plan of selling drugs to addicts at low prices.	22 October 1935
O.C.	1642	Anti-narcotic education and propaganda.	18 May 1936
O.C.	1645	Note on anti-opium propaganda among school pupils in Indo-China.	26 May 1936
O.C.	1657	Report of the Sub-Committee on drug addiction.	3 June 1936
O.C.	1660 and	Statistical study in regard to opium addiction in Formosa.	28 August 1936
O.C.	1660(a)		1 April 1937
O.C.	1661	Formula for the anti-opium pills used by the Government of Iran in treating drug addicts.	24 July 1936
O.C.	1686	Anti-narcotic education and propaganda in medical and auxiliary	18 May 1937 and
O.C.	1686(a)	medical circles.	27 April 1939
O.C.	1692	Drug addiction among infant children born of addict mothers.	18 May 1937
O.C.	1695	Codeine addiction.	21 May 1937
O.C.	1695(a)		27 January 1939
	and (b)		16 May 1939
O.C.	1710	Clinical studies of drug addiction.	27 August 1937
O.C.	1732	Clinical studies of drug addiction (USA).	14 May 1938
O.C.	1741	Decree dated 27 January 1937, issued by the Directorate-General of Public Health in Bulgaria concerning registration and classification of drug addicts.	9 June 1938
O.C.	1753	The Opium Smoking Habit in India and Present Position of the Opium Smoking Habit in India. Parts I, II and III. By Brevet-Colonel R. N. Chopra and G. S. Chopra, M.B., B.S.	19 January 1939
O.C.	1755	Studies on drug addiction (USA).	26 January 1939
O.C.	1761	Drug addiction. Memoranda by the Acting Surgeon General of the Public Health Service of the United States of America.	4 May 1939
O.C.	1769	Enquiry into drug addiction. Replies to Circular Letter C.L.193. 1936.XI, dated 3 November 1936.	31 May 1939

V. MISCELLANEOUS

O.C.	432	Prospectus of an opium company at Shanghai. Forwarded by the British Representative.	22 May 1926
O.C.	951	Peyote and Mescalin.	20 March 1929
O.C.	972	Note by Mr. Caldwell on drugs of the barbitone group.	April 1929
O.C.	1617	Reports on the characteristics and uses of the plant Kat (*catha edulis*).	5 February 1936
O.C.	1678	United States Public Health Service publication entitled "The Relief of Pain in Cancer Patients".	16 March 1937
O.C.	1702	The treatment of cancer with cephalin and serum.	31 May 1937
O.C.	1713	Investigation of the possibility of substituting cobra-venom for narcotic drugs as an analgesic in certain cases.	1 November 1937
O.C.	1721	Measures to determine the presence of drugs in suspected substances.	24 February 1938

CORRECTION

"Another drug is placed under international control" in the *Bulletin on Narcotics*, vol. IV, no. 3, July-September 1952; page 21, 19th line from the bottom second column should read:

"decided that "β-4-morpholinylethylmorphine" and its salts should be."